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ABSTRACT

This book is designed to aid and to encourage physical education teachers to incorporate the concepts of physical fitness into the physical education curriculum. The activities are written in an outline format using the following headings: (1) concept; (2) activity and/or knowledge level; (3) location (school or home); (4) time needed; (5) objective; (6) materials needed; (7) definition of terms; (8) activity description with discussion topics; (9) expansion of activity; (10) suggested readings; and (11) author's notes. Some activities require a lecture format, but, for the most part, exercise and discussion are combined in the lesson plan. Among the concepts treated are: basic physical fitness awareness; muscular endurance; strength; cardiovascular fitness; and body composition. Charts provide directions, precautions, body areas affected, and alternate exercises for isometric strength and muscular endurance training exercises. Appendices include a sample exercise worksheet to trace student progress, a list of weight training activities, and weight guidelines for strength and muscular endurance training. An annotated bibliography provides suggested resources on physical fitness. (FG)

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# Teach for Fitness

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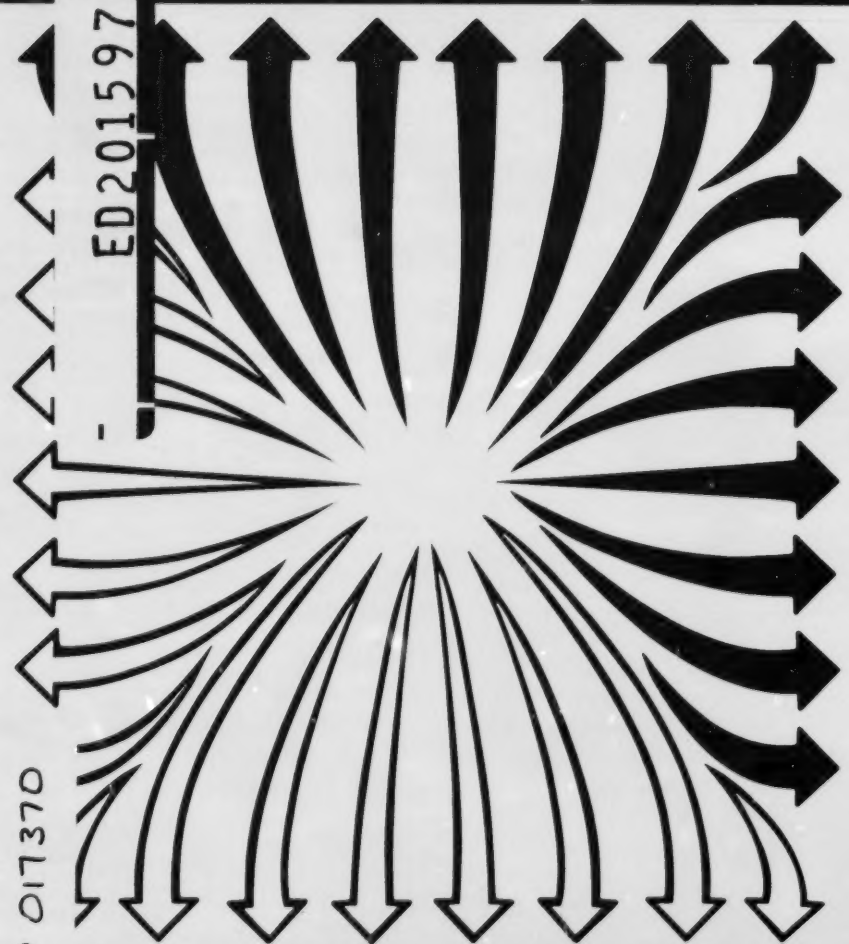

## Current Issues

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# TEACH FOR FITNESS: A MANUAL FOR TEACHING FITNESS CONCEPTS IN K-12 PHYSICAL EDUCATION

by

Laurie Priest

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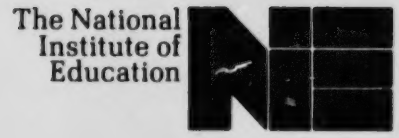


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Manual provides the teacher with curriculum strategies to enhance K-12 students' understanding and knowledge of exercises and activities designed to promote, develop and maintain physical fitness.

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## FOREWORD

Adults know they should be concerned about fitness. The good, active life bombards them from all sides, but engaging in fitness activities is not something in which many adults indulge. For many, physical education--if it was offered at all--was no more than softball, volleyball, or other competitive team sports of that ilk. Fitness concepts were seldom discussed by a physical educator, and biology teachers did not relate exercise to their subject areas either.

The contents of this ERIC Clearinghouse on Teacher Education publication aim to help physical education teachers provide the kinds of instruction that will lead to lifelong fitness attitudes. The Clearinghouse is pleased to acknowledge the professional contribution of its staff associate for Health, Physical Education, and Recreation, Laurie Priest. Her enthusiasm for, dedication to, and competence in her field are obvious in the quality of this document. Acknowledgments also go to the content reviewers for their valuable suggestions.

Readers are invited and encouraged to comment on this monograph and to submit related documents for possible inclusion in the ERIC system. For information, write or call the Senior Information Analyst, ERIC Clearinghouse on Teacher Education, One Dupont Circle, Suite 610, Washington, DC 20036, or (202) 293-2450.

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SHARON G. BOARDMAN
Editor, ERIC Clearinghouse
on Teacher Education

# INTRODUCTION

Teach for Fitness: A Manual for Teaching Fitness Concepts in K-12 Physical Education is designed to aid and encourage physical education teachers to incorporate the teaching of physical fitness concepts into the physical education curriculum. For too long educators have taught students how to exercise, but not why to exercise.

The why also needs an answer that illustrates the teaching of lifelong physical education activities. If physical education programs are to survive, physical educators must have a positive and continuing effect on the lives of their students. Students must learn the rationale behind movement and fitness activities and be urged to incorporate exercise and activity into their present and future life styles.

Cardiovascular disease and low back pain are major health problems in the United States today, and many other major diseases and minor ailments afflict people. There is supportive evidence that degenerative conditions begin in childhood. Recent research shows that one or more heart disease risk factors, such as obesity and high blood pressure, have been identified in children and that vigorous physical education programs have been able to decrease these factors. About low back pain, 80% of Americans have or will complain of it at some time in their lives. Medical researchers have linked this high incidence of low back pain with a lack of exercise.

Studies have also shown that the vast majority of our nation's adults believe that what they learned as students in physical education programs is not applicable to their adult lives. However, 1,400 books on health and physical fitness are currently in print, some even best sellers, which illustrates a need and interest in understanding physical fitness.

This book does not suggest that physical fitness is the only objective of the physical education curriculum, but that it should be recognized and accepted as a significant program goal. If students are to understand fitness knowledge and be expected to continue lifelong fitness activities, the curriculum must include the teaching of fitness concepts. Students must realize that what is taught in the classroom or gymnasium needs to be integrated into their daily lives.

Selected physical fitness concepts are used as guidelines in the organization of Teach for Fitness: A Manual for Teaching Fitness Concepts in K-12 Physical Education.

The activities are written in an outline format using the following headings: concept, level, location, time, objective, materials, terms, activity, author's notes, expansion, resources, and teacher's notes. The aim of lower level activities is to introduce the concepts of physical fitness. Middle and upper level activities introduce a more advanced activity level. The level of activity taught will depend upon the students' present knowledge in the area of physical fitness. All activities can be modified to meet

individual and class needs, and for this reason specific grade levels have not been assigned. Some activities require a lecture format, but whenever possible exercise and activity should be included as an integral part of a lesson plan. Teachers must remember that the activities presented are just a few examples of teaching fitness concepts. Notes and expansion sections offer additional resources and suggestions for building upon a particular activity. The extensive annotated bibliography should aid teachers in identifying resource materials for expanding on class activities.

Readers should keep in mind that this book provides only a starting point for the teaching of physical fitness concepts and for the opportunity to encourage students to incorporate physical fitness activities into their daily lives.

CONCEPT: Physical Fitness

LEVEL: Lower LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will have an understanding of physical fitness.

MATERIALS: None

TERMS: Physical fitness--"the ability to carry out daily tasks with vigor and to engage in leisure time pursuits and to meet the above average physical stresses encountered in emergency situations" ("Definition" 1979, p. 28)

ACTIVITY:
1. Discuss with students the definition of physical fitness and what physical fitness means to them.
2. Ask students why they think it is important to keep physically fit.
3. Discuss with students the health-related components of physical fitness:
   strength--how strong muscles are
   muscular endurance--how long muscles will work
   flexibility--how far muscles will stretch
   cardiovascular endurance--how much oxygen the body can supply to working muscles
   body composition--how much fat, muscle, bone, etc. the body has
4. Have students discuss what these components mean to them.
5. Have students list animals that have the different components of physical fitness, e.g., bears are strong, pigs fat, snakes flexible.
6. Have students do an exercise to illustrate each component of physical fitness, e.g., push-ups (arm strength), arm-circles (muscular endurance), toe touches (flexibility), run in place (cardiovascular endurance).

EXPANSION: During classroom activities/exercises, help make students aware of components of physical fitness, and have them perform appropriate exercises. Students can test their level of physical fitness, including the health-related components, by using the AAHPERD Health-Related Physical Fitness Test (see page 15).

RESOURCES: "Definition of Physical Fitness," Journal of Physical Education and Recreation; Suggestions for School Programs, President's Council on Physical Fitness and Sports.

TEACHER'S NOTES:

CONCEPT: Human Heart

LEVEL: Lower LOCATION: School TIME: 10 minutes

OBJECTIVE: The students will understand the size and location of the human heart.

MATERIALS: Poster or picture of the human heart

TERMS: None

ACTIVITY:
1. Have students make a fist with their hands. Explain that the heart is as big as a person's own fist.
2. By opening and closing your fist, demonstrate to students how the heart beats to pump blood to the body.
3. Discuss with students where the heart is in the chest. Use posters or books to show students.

AUTHOR'S NOTES: The teacher can contact local or state affiliates of the American Heart Association for further information.
--For student observation, the teacher might want to obtain an animal heart (cow, pig) from the local butcher or grocery store.
--Anatomy or science textbook illustrations of the heart can be used.

EXPANSION: Students can further their understanding of how the heart pumps blood by clasping their hands together in a bucket of water and forming a spout with the thumbs and first finger. Squeeze hands together to force water through the spout. Students should understand that the heart pumps blood in a similar fashion.
--Students could lie down and trace their bodies on large pieces of paper and then draw the heart in its proper location.

RESOURCES: Jenkins, "Cardiovascular Fitness Education for Elementary Students"; Kern, "Jogging Through the Circulatory Systems"; Kuntzleman, Color Me Red.

TEACHER'S NOTES:

CONCEPT: Heart Rate

LEVEL: Lower LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will be aware that the heart beats faster during exercise/activity.

MATERIALS: Stethoscopes or cardboard tubes (paper towel size)

TERMS: Heart rate--number of beats per minute

ACTIVITY:
1. Review where the heart is located in the chest.
2. Split students into groups of three or four. Each group should have a stethoscope or cardboard tube.
3. Have students listen to their own heartbeat and other students' heartbeats in their group while they are sitting quietly.
4. For student observation, the teacher might want to obtain an animal heart (cow, pig) from the local butcher and grocery store.
5. Have students run in place for two minutes and then listen to their own heartbeats and those of other students.
6. Discuss the differences in heart rate while sitting quietly and after running.

AUTHOR'S NOTES: Students can listen to their heartbeats on their chests or backs.
--Make sure all students have the opportunity to listen to their heartbeats immediately after exercise.
--Students should understand that more blood is needed in the muscles when a person is exercising.

EXPANSION: Have students stop and check their heart rates during physical education activities/sports. What activities make the heart beat faster? Do certain activities make the heart beat faster than others?

RESOURCES: University of the State of New York, Cardiogenics--An Essential Part of the Physical Education Instructional Program.

TEACHER'S NOTES:

CONCEPT: Breath Rates

LEVEL: Lower LOCATION: School TIME: 10 minutes

OBJECTIVE: The students will be aware that they breathe heavier when exercising.

MATERIALS: Balloons, picture or poster of the lungs

TERMS: None

ACTIVITY:
1. Discuss with students the body's need for increased oxygen during exercise.
2. Have students sit quietly with their hands on their chests and feel them move as air is inhaled and exhaled through the lungs.
3. Have students run in place for two minutes and then stop. Have students immediately put their hands on their chests and feel them move.
4. Discuss the difference in the rate of breathing at rest and after activity.

AUTHOR'S NOTES: Balloons can be used to illustrate how lungs expand as one inhales.
--A picture or poster of the lungs should be available for student examination.
--Additional information and materials can be obtained from the American Lung Association.
--Students should understand that the lungs supply oxygen to the blood.

EXPANSION: As students engage in different activities/exercises, the teacher can have them stop and feel their chests as they breathe. What activities will make them breathe heavier than others?

RESOURCES: Conniff, "The Many Mysteries of Breath."

TEACHER'S NOTES:

CONCEPT: Nutrition

LEVEL: Lower LOCATION: School TIME: 30 minutes

OBJECTIVE: The students will be aware of the foods they eat.

MATERIALS: Old magazines or newspapers, scissors, glue, six to eight poster boards or brown paper

TERMS: None

ACTIVITY:
1. Have students split into groups of four to six.
2. Have students cut pictures from magazines that show the kinds of foods they usually eat.
3. Have students glue pictures on the poster board. The teacher should help students put the poster board on the wall.
4. Have entire class discuss the kinds of food they eat and have students determine which foods are nutritious and good and which are not. What foods may cause a person to gain weight? Which foods should be eaten?

AUTHOR'S NOTES: Physical education and health teachers might coordinate this activity with a unit on nutrition.

EXPANSION: Students should keep daily logs of the foods they eat.

RESOURCES: Kuntzleman, Fitness Discovery Activities; Pangrazi, "Treating the Obese Child in the Public School Setting."

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: Lower LOCATION: School or Home TIME: 20 minutes

OBJECTIVE: The students will understand that daily activities require certain levels of physical fitness.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Review with students the components of physical fitness: strength, muscular endurance, flexibility, cardiovascular endurance, and body composition. (See page 3.)
2. Have students select daily tasks and activities that require physical fitness, e.g., carrying logs into the house for a fire, helping Mom and Dad move furniture, chopping wood, carrying groceries, running to catch the bus.
3. Have students talk with their parents, brothers, and sisters to find out what types of activities they do to stay physically fit.
4. Have students report to class on the things people do to stay fit.

AUTHOR'S NOTES: This activity could be combined with an English class assignment and students could write a report on their findings.

EXPANSION: Students could write papers describing their favorite sports, including the components of physical fitness needed and how one becomes physically fit for the sport.

TEACHER'S NOTES:

CONCEPT: Physical Fitness and Work

LEVEL: Lower LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand that different jobs require different components of physical fitness.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Review with students the health-related components of physical fitness: strength, muscular endurance, flexiblity, cardiovascular fitness, body composition. (See page 3.)
2. Have students identify different jobs that require different components of physical fitness, e.g., police officer, firefighter, dancer, construction worker.
3. Discuss with students how physical fitness relates to the jobs they identified. For example, what happens if a construction worker does not have enough strength for the job? Or if a firefighter does not have enough muscular endurance for that job?
4. Have students select jobs they might want to pursue when they grow up. Have them determine what components of physical fitness are required for their future jobs and share this information with the class. Students who select jobs that do not require physical fitness should develop exercise programs that can be incorporated into their future life styles.

EXPANSION: The teacher could arrange for students to visit a local fire department to observe job fitness demands and ways firefighters maintain their physical fitness. Students could also visit dance studios, construction sites, police stations, etc.

RESOURCES: Clarke, "Fitness for Firefighters"; Jacobs, "Opening Doors to Fitness"; Sharkey et al., "Fit to Work."

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: Lower LOCATION: School TIME: 30 minutes

OBJECTIVE: The students make a collage depicting physically fit people.

MATERIALS: Old magazines, newspapers, scissors, glue, poster board

TERMS: None

ACTIVITY:
1. Review with students the health-related components of physical fitness: strength, muscular endurance, flexibility, cardiovascular endurance, and body composition. (See page 3.)
2. Have students cut pictures from magazines to depict people who are physically fit.
3. Have each student select a picture to glue onto the poster board.
4. Discuss with students the pictures on the board. What components of physical fitness are illustrated in the collage? Which pictures indicate that some people need to be physically fit? Why do all people need to be physically fit?

AUTHOR'S NOTES: Students need to understand that people in all walks of life need to be physically fit.
--Poster/collage could be left hanging on the wall to reinforce the need for physical fitness in students' daily lives.

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: Lower LOCATION: School or Home TIME: 10 minutes

OBJECTIVE: The students will understand the importance of physical fitness throughout their lives.

MATERIALS: Notebooks

TERMS: None

ACTIVITY:
1. Discuss with students the concept and purpose of a savings account, e.g., working today to save for future needs.
2. Explain to students that developing and maintaining their physical fitness level is equally important. The physical effort that they expend today will improve their fitness levels and, in turn, will help them throughout their lives. Physical activity is an "investment" in their futures.
3. Have students keep a "fitness account" in individual notebooks. Students should record their participation in physical activities/exercise in and out of school on a daily basis. Stress to students that this is a personal account that will serve to monitor their fitness development.

AUTHOR'S NOTES: The physical education teacher could design notebooks that resemble savings account passbooks for the students.
--The teacher could also encourage students to "invest" in their futures by being active outside of class.

RESOURCES: Canadian Association for Health, Physical Education, and Recreation, Physical Fitness Programs; Johnston, "Fun in Fitness at the Elementary School Level"; Levitt, "Fitness on Your Own Time."

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: Middle/Upper LOCATION: School TIME: 10 minutes

OBJECTIVE: The students will understand the definition of physical fitness.

MATERIALS: None

TERMS: Physical fitness (defined below)

ACTIVITY:
1. Ask students what they think the term "physical fitness" means.
2. Discuss with students the definition of physical fitness: "...the ability to carry out daily tasks with vigor and to engage in leisure time pursuits and to meet the above average physical stresses encountered in emergency situations" ("Definition" 1979, p. 28.)
3. Ask students to list daily activities that require some level of physical fitness (e.g., running to catch a bus, moving furniture, etc.)
4. Explain to students that there are two types of physical fitness. One is performance related, which helps students to perform motor skills (enhancing athletic ability). The other is health related, that helps students to remain healthy and active.

EXPANSION: Students could write a one-page paper on why it is important to be physically fit. Papers could be shared with the class.

RESOURCES: Corbin and Lindsay, Fitness for Life.

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: Middle/Upper LOCATION: School TIME: 25 minutes

OBJECTIVE: The students will understand the different components of fitness and be able to differentiate between performance-related fitness and health-related fitness.

MATERIALS: None

TERMS: Agility, balance, coordination, power, reaction time, speed, strength, muscular endurance, flexibility, cardiovascular fitness, body composition (defined below)

ACTIVITY:

1. Discuss with students the performance-related components of fitness:
   a. agility--the ability of a person to change direction or body position quickly and control the movement of the entire body.
   b. balance--the ability to maintain a desired position of the body, both in movement and in stationary positions.
   c. coordination--the ability to integrate muscle motions into an efficient pattern of movement.
   d. power--the ability to release maximum force or to contract the muscles in the shortest possible time.
   e. reaction time--the time it takes to perceive a stimulus and begin movement.
2. Have students list different sports and activities that require the performance-related components of fitness.
3. Discuss with students the health-related components of fitness:
   a. strength--the amount of force a muscle or muscle group can exert.
   b. muscular endurance--the ability to perform repeated muscle movements for a given period of time.
   c. flexibility--the ability to move a joint through a full range of motion.
   d. cardiovascular function--the body's ability to continuously provide oxygen to the body as it performs work over an extended period of time.
   e. body composition--the relative percentages of fat and fat-free body mass.
4. Have students list different sports and activities that require the health-related components of fitness.

RESOURCES: American Alliance for Health, Physical Education, Recreation, Dance, Lifetime Health-Related Physical Fitness Test Manual; Corbin and Lindsay, Fitness for Life; Falls, "Modern Components of Physical Fitness."

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: All LOCATION: School TIME: 2-3 class periods

OBJECTIVE: The students will measure their level of physical fitness, based on the AAHPERD Youth Fitness Test Manual.

MATERIALS: Horizontal bar, two blocks of wood, gym bar, stopwatches with split second timers, tape measure, track or other area measured off at 600 yards

TERMS: None

ACTIVITY:
1. Discuss with students the purpose of the AAHPERD Youth Physical Fitness Test. Describe each of the following six test items and what each item measures:
   a. pull-ups: arm and shoulder girdle strength
   b. sit-ups: efficiency of abdominal and hip flexor muscles
   c. shuttle run: speed and agility
   d. standing long jump: explosive muscle power of the leg extensors
   e. 50-yard dash: speed
   f. 600-yard run/walk: cardiovascular efficiency
2. Have students take the test and help them to assess their own performances by using the national norms established for each item.

AUTHOR'S NOTES: Students can help set up test stations, administer tests, keep their own records, and make up an assessment chart or performance profile.

EXPANSION: A letter could be sent to parents describing the fitness test, their child's results, any award the student qualifies for, and follow-up advice.
--Using their performance profiles, students could design programs to help them improve their performance-related components of physical fitness and periodically take the AAHPERD Youth Fitness Test to assess their progress.

RESOURCES: AAHPERD Youth Fitness Test Manual; "Computerized Report Cards Aid School Fitness Program," President's Council on Physical Fitness and Sports Newsletter.

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: All LOCATION: School TIME: 2-3 class periods

OBJECTIVE: The students will measure their levels of physical fitness based on the AAHPERD Lifetime Health-Related Physical Fitness Test Manual.

MATERIALS: Track area measured off, skinfold caliper, mats, stop watch, specially constructed box with measuring scale

TERMS: None

ACTIVITY:
1. Discuss with students the purposes of the AAHPERD Lifetime Health-Related Physical Fitness Test. Describe each of the four test items and what each item measures.
    a. One-mile or nine-minute run: cardiovascular efficiency
    b. Skin fold test: body composition
    c. Modified, timed sit-ups and sit and reach: abdominal and lower back-hamstring musculoskeletal function
2. Have students take the test and help them to assess their performances using the national norms established for each item.

AUTHOR'S NOTES: Students can help set up test stations, administer tests, keep their own records, and make an assessment chart or performance profile.

EXPANSION: Using their performance profiles, students could design programs to help them improve their physical fitness and periodically take the AAHPERD Lifetime Health-Related Physical Fitness Test to assess their progress.
--A letter could be sent to parents about the fitness testing. Information could include a description of the test, their child's results, any award for which the student qualifies, and follow-up advice.

RESOURCES: AAHPERD Lifetime Health-Related Fitness Test Manual; Austin, "Physical Fitness Reporting: A Method for Improving School/Community Relations; Brown et al., First State Fitness Test; Pate, "Fitness Testing with a Realistic Purpose"; "Computerized Report Cards Aid School Fitness Program," President's Council on Physical Fitness and Sports Newsletter.

TEACHER'S NOTES:

CONCEPT: Physical Fitness

LEVEL: Middle LOCATION: School or Home TIME: 30 minutes

OBJECTIVE: The student will make a notebook of activities concerning physical fitness.

MATERIALS: Old newspapers, magazines, glue, scissors

TERMS: None

ACTIVITY:
1. Have students cut articles from the newspaper, magazines, etc., that relate to physical fitness.
2. Have students report to the class on two of the most interesting articles included in their notebooks.

AUTHOR'S NOTES: This activity could be combined with a writing assignment for an English class.
--It is important that students realize that many articles on physical fitness are to be found in many newspapers and magazines.

TEACHER'S NOTES:

CONCEPT: Bones

LEVEL: Middle/Upper LOCATION: School TIME: 10 minutes

OBJECTIVE: The students will learn the major bones of the human body.

MATERIALS: Skeleton or a poster of one

TERMS: None

ACTIVITY:
1. Discuss with students the following bones and where they are located: clavicle; scapula: vertibrae; sternum; ribs; humerus; radius; ulna; femur; patella; tibia; fibula.
2. Review with students the relationship between bones and muscles. Their major cooperative function is to produce movement.
3. Discuss with students the idea that a joint is formed where two bones meet. The bones are held together by ligaments. Joints are where flexibility is measured.

AUTHOR'S NOTES: Have a skeleton or a poster of one for student examination.
--Have students locate their own bones on their bodies.
--The muscles and bones are referred to as the musculoskeletal system.

EXPANSION: During class activities use the names of bones to help reinforce knowledge of the bones. This can easily be done in skill development activities.

TEACHER'S NOTES:

CONCEPT: Skeletal Muscles

LEVEL: Middle/Upper LOCATION: School TIME: 10 minutes

OBJECTIVE: The students will learn the major skeletal muscles of the human body.

MATERIALS: Poster illustrating skeletal muscles

TERMS: Skeletal muscles--bands of contractile fibers that attach to bones and produce movement

ACTIVITY:
1. Discuss with students the following muscles and where they are located: deltoid; trapezius; pectorals; latissimus dorsi; biceps; triceps; brachioradialis; abdominals; gluteals; quadriceps; hamstrings; gastrocnemius; soleus.
2. Discuss with students that muscles are attached to bones by tendons. As muscles contract and expand, bones are moved.

AUTHOR'S NOTES: Have a poster available to show students the muscles.
--Have students also feel these muscles on their own bodies.
--Skeletal muscle accounts for approximately 40 percent of total body weight.
--There are about 600 muscles in the human body.
--Tendons are much tougher than muscles and are composed of nonliving fibers. The muscles enable people to move, stand erect, and carry out activities.

EXPANSION: During class activities use the names of the muscles to help students learn those names.

RESOURCES: Bunk, "Muscle of the Week"; "Structure and Function of Skeletal Muscle," Physician and Sportsmedicine.

TEACHER'S NOTES:

CONCEPT: Warm-up/Cool-down

LEVEL: Middle/Upper LOCATION: School TIME: 2 class periods

OBJECTIVE: The students will understand the importance of warming up before physical activity and cooling down after.

MATERIALS: Stopwatch or clock with second hand

TERMS: Warm-up--a brief period of mild exercise/activity prior to vigorous exercise
Cool-down--a brief period of mild exercise/activity immediately following vigorous exercise

ACTIVITY:
1. Discuss with students reasons why warming up is important, i.e., stimulates blood flow, helps to loosen muscles, increases body temperature, awakens nerves.
2. Discuss with students why cooling down is important, i.e., slows body functions down gradually, muscles continue to contract to aid venous blood return to the heart.
3. Discuss with students different warm-up and cool-down activities, such as slow jogging, walking, stretching, calisthenics.
4. Have students warm up slowly and run approximately 220 yards or two minutes, then stop and sit down, and take their pulses after one minute. Have them record heart rate. On another class day, have students run 220 yards once again, then stop. Instead of sitting, have them walk for one minute, and take the pulse after that minute. Discuss with students how walking and cooling down aids body recovery.

EXPANSION: The teacher should always include warm-up and cool-down when activities include vigorous exercise/activity.

RESOURCES: Corbin and Lindsay, Fitness for Life; Corbitt, "Warm-Up, Warm-Down: How to Choose the Right Technique."

TEACHER'S NOTES:

CONCEPT: Principles of Exercise

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand the three general principles of exercise.

MATERIALS: None

TERMS: Overload, specificity, and progression (defined below)

ACTIVITY:

1. Discuss with students the following principles of exercise:
   a. overload--a person needs to do more than would normally be done to improve fitness. For example, muscles will not become stronger unless they are exercised at higher than normal levels.
   b. specificity--a person needs to do specific exercises to improve specific components of physical fitness and specific body parts. In other words, specific exercises are needed for specific results. For example, lifting weights will improve the strength of muscles involved in the exercise, but may not affect other muscles or flexibility.
   c. progression--A person needs to start exercising slowly and to increase the amount of exercise done over a period of time. For example, at the beginning of a running program, a person runs short distances and gradually increases these distances.
2. Explain to students that these three principles apply to strength, muscular endurance, flexibility, and cardiovascular fitness.
3. Have students give examples of how these principles apply to strength, muscular endurance, flexibility, and cardiovascular fitness.
4. Have students do activities/exercises that reinforce the principles of exercise.

EXPANSION: During class activities/exercises, include the principles of exercise whenever appropriate.

RESOURCES: AAHPERD Lifetime Health-Related Physical Fitness Test Manual; Corbin and Lindsay, Fitness for Life.

TEACHER'S NOTES:

CONCEPT: Fitness Guidelines

LEVEL: Middle/Upper LOCATION: School TIME: 30 minutes

OBJECTIVE: The students will understand that the guidelines for physical fitness are based on three factors: intensity, frequency, and duration.

MATERIALS: None

TERMS: Intensity, frequency, duration (defined below)
Repetitions--the number of times an exercise is performed
Sets--a given number of repetitions
1RM--maximum weight lifted in one repetition of the exercise

ACTIVITY:
1. Discuss and define the three guidelines:
   a. intensity--how hard one exercises
   b. frequency--how often one exercises
   c. duration--how long one exercises
2. Discuss with students how these three factors apply to strength, muscular endurance, flexibility, and cardiorespiratory fitness (see chart on next page).

AUTHOR'S NOTES: The intensity at which a person exercises is usually determined by a percentage of the maximum amount of the exercise he or she can perform.
--To increase physical fitness, most exercises should be performed three to four times a week.
--Duration is usually expressed in sets and repetitions for all areas except for cardiovascular fitness.

RESOURCES: Corbin and Lindsay, Fitness for Life.

TEACHER'S NOTES:

GUIDELINES FOR PHYSICAL FITNESS

| Component | Intensity | Frequency | Duration |
|---|---|---|---|
| Strength: Isotonic Exercises | Body weight or a portion of the body weight | 3-4 days/week | 3 sets 5-7 repetitions |
| Strength: Isometric Exercises | Contract muscles as tightly as possible | 3-4 days/week | 3 sets Hold exercise for 5-7 seconds |
| Strength: Weight Training | 80-90%of 1RM* | 3-4 days/week | 3 sets 5 repetitions |
| Muscular Endurance: Isotonic Exercises | Body weight or a portion of the body weight | 3-4 days/week | 3 sets 15-25 repetitions |
| Muscular Endurance: Weight Training | 30-50% of 1RM* | 3-4 days/week | 3 sets 15-25 repetitions |
| Flexibility | Muscle is stretched beyond normal length to reach stretching point | 3-4 days/week | 3 sets Hold stretch for 10-15 seconds |
| Cardio-vascular fitness | 70-80% of maximum heart rate | 3-4 days/week | Activity with large muscle groups must last at least 20 minutes |

*Maximum weight lifted in one repetition of the exercise.

CONCEPT: Strength

LEVEL: Middle/Upper LOCATION: School TIME: 30 minutes

OBJECTIVE: The students will understand how the general principles of exercise and the guidelines for physical fitness relate to strength.

MATERIALS: None

TERMS: Strength--the amount of force a muscle or muscle group can exert
Isotonic or dynamic contractions--a muscle contraction with movement (e.g., isotonic exercises or weight training)
Isometric or static contractions--a muscle contraction with little or no movement (e.g., pushing against a wall)
Isokinetic contraction--a muscle contraction with equal resistance through a full range of motion (e.g., accommodating resistance exercise machines are needed for isokinetic training)

ACTIVITY:
1. Discuss with students how overload, specificity, and progression relate to strength training.
2. Discuss with students the guidelines for physical fitness and how they apply to strength training.
   a. intensity: how hard an activity is conducted
isotonic exercises--body weight or a portion of body weight is moved
isometric exercises--contract muscles as tightly as possible
weight training--80 to 90 percent of 1RM (repetition maximum)
   b. frequency: how often an activity is conducted (three to four days a week.)
   c. duration: how long an activity is conducted
   Three sets of five to seven repetitions of isotonic exercises. Three sets of five to seven seconds for isometric exercises.
3. Discuss with students the advantages and disadvantages of isotonic and isometric exercises. (See chart on next page.)

AUTHOR'S NOTES: For strength to increase, a very heavy weight is lifted for a small number of repetitions.
--Students should understand that weight training is an isotonic exercise because weights are moved by the muscles. (Here isotonic exercises are used to differentiate them from isometric exercises.)
--The teacher should explain that girls will not develop bulky muscles from weight training because they lack the necessary male hormone, testosterone, that plays a major role in increasing muscle bulk.

RESOURCES: Muscular Strength--A Basic Component of Physical Fitness, President's Council on Physical Fitness and Sports.

TEACHER'S NOTES:

ISOTONIC EXERCISE vs. ISOMETRIC EXERCISE

| | Isotonic | Isometric |
|---|---|---|
| Advantages | --gains in strength can be measured<br>--greater muscle hypertrophy is developed<br>--strength is developed through full range of motion | --can be done with no equipment in a small area<br>--causes little muscle soreness |
| Disadvantages | --special equipment is needed in weight training | --restricts blood to muscles<br>--difficult to measure strength gains<br>--strength is not developed through full range of motion |

CONCEPT: Strength

LEVEL: Middle/Upper LOCATION: School TIME: 1-2 class periods

OBJECTIVE: The students will learn isotonic exercises that promote strength in the major muscles.

MATERIALS: Chin-up bar, parallel bars

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and guidelines for physical fitness (intensity, frequency, duration) and how they apply to isotonic exercises. (See page 23.)
2. Discuss isotonic exercises, emphasizing the correct way to perform the exercise, body areas strengthened, major muscles strengthened, and precautions to take in performing the exercise (see chart on next pages).
3. Have students perform warm-up activities for five minutes.
4. Have students split into groups with one group at each exercise station and perform each of the exercises. If students cannot perform the desired number of repetitions, have them do as many as they can, or do the alternate (easier) activity until they can perform the prescribed exercise.

AUTHOR'S NOTES: Stress safety in performing all exercises.
--Students should be reminded that progression is important. Do not do <u>too</u> much <u>too</u> soon.
--The teacher may want to have students move around the gym from one exercise to the next until three sets are performed.
--Charts can be placed at each exercise station with information on the body areas strengthened, major muscles strengthened, and precautions to be taken.

EXPANSION: Have students suggest other types of calisthenics/exercises that will increase strength.

TEACHER'S NOTES:

ISOTONIC STRENGTH TRAINING EXERCISES

| Exercise | Directions for exercise | Body areas | Major muscles |
|---|---|---|---|
| Push-ups | Lie face down on floor with hands next to shoulders. Keep body straight as you push up and straighten arms. Only hands and toes should be in contact with floor. Lower the body by bending the arms until the chest is within an inch of the floor. | Arms, chest | Triceps, pectorals, abdominals |
| Sit-ups | Lie on back with arms crossed on chest and hands on opposite shoulders, with knees bent at a 90-degree angle. Curl up by first flexing the neck and then flexing the lumbar spine until the elbows touch the thighs. Return to original position. | Abdomen, hips | Abdominals, quadriceps |
| Chin-ups | Hang from bar with palms facing away from body and feet off floor. Pull the body upward toward the bar until the chin is even with the bar and then return to a starting position. | Forearms, upper arms, back | Biceps, latissimus dorsi, trapezius, brachioradialis |
| Single leg knee dip | Stand facing a partner and hold hands as if shaking hands. Have one person stand on one foot and squat down (knee should be at 90-degree angle). The opposite leg should be straight and pointed forward (not held bent behind student). Partner's hand should be used only for balance. | Legs | Hamstrings, quadriceps |
| Back curl-up | Lie on stomach with hands clasped behind head. Have partner hold down calves. Curl backwards, lifting chest as far off floor as possible. Return to starting position to complete exercise. | Lower back, buttocks, upper legs | Gluteals, hamstrings, trapezius |
| Dip | Body is supported in a suspended position between the parallel bars. With fingers pointed outward, dip down as far as possible and return to starting position to complete exercise. | Shoulders, forearms, upper arms | Triceps, deltoids, pectoral, forearm flexors |
| High jumper | Stand in a crouched position with knees bent almost 90 degrees. Arms should be extended backward. Jump as high as possible into the air and swing arms upward over the head. | Legs, buttocks | Gluteals, hamstrings, quadriceps, gastrocnemius, soleus |

| Precautions | Alternate exercise (easy) | Alternate exercise (difficult) |
|---|---|---|
| Keep head back and legs straight. | Student can do push-up from the knees. | Student can perform push-up with feet elevated. |
| Do not arch back. Tuck ankles under stationary place or have another student hold them. | Student can put hands under thighs to help pull up. | Weight can be added behind the head or on the chest to increase resistance, or sit-ups can be done on an inclined board. |
| Straighten arms on each repetition. Avoid body swing. | Student can hang from bar at 45-degrees with heels touching floor (palms facing away from body), keeping body straight, pull chin to bar and then lower to starting position. | Add weight to student. If weight vest is unavailable, improvise using an inner tube filled with sand or bleach bottles filled with water or sand and hung with rope. When using the latter, a pad or towel should be put on the student's neck. |
| Hold partner's hand only for balance, not to lift student. | Use partner's hand to help lift up if needed. | Add weight to student. (See Chin-ups.) |
| Do not let legs rise off floor. | Students can put hands on thighs to lower resistance on curl-up. | Weight can be added behind the head. |
| Keep body as straight as possible and avoid body swing. | Student can lower resistance by using a one-foot high bench behind body. Place hands on bench edge with arms extended. Body is at 45-degree angle to floor; heels are on floor. Dip to one inch from floor and return to starting position. | Dip down until shoulders are even with parallel bars. Weight can be added to the student using an inner tube filled with sand or bleach bottles filled with sand or water. |
| Make sure students jump straight up into air. | All students can perform this exercise. | Ankle weights can be added to increase weight. |

CONCEPT: Strength

LEVEL: Middle/Upper LOCATION: School TIME: 1 class period

OBJECTIVE: The students will develop a personal exercise program to promote strength.

MATERIALS: Parallel bars or double bars (dips), chin-up bar, mats.

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how they apply to isotonic exercises. (See page 23.)
2. Have students perform warm-up activities for five minutes.
3. Have students split into groups and have each group start at a station set up for the isotonic exercises.
4. Have students do as many of the exercises as they can, up to seven repetitions. If the students cannot do at least five repetitions of the exercises, have them perform the easier alternative exercises. If the students can perform more than eight repetitions, have them perform the more difficult alternate exercise.
5. Have students fill out exercise worksheets (see Appendix A).

AUTHOR'S NOTES: See calisthenics on pages 26-27. They are listed in the order in which stations can be set to avoid the same muscle groups being exercised at consecutive stations.
--The teacher should help students to identify body areas that are weak and need special attention for strength training.
--It is important that students work for individual improvement and not compete with others in the class.

EXPANSION: Encourage students to engage in these strength training exercises out of class. It is important for exercises learned in school to carry over into the home so that students will incorporate exercise into their daily lives.
--Encourage students to keep charts at home of their exercise routines.
--Periodically let students test themselves in class to determine their progress.

RESOURCE: Levitt, "Fitness on Your Own Time."

TEACHER'S NOTES:

CONCEPT: Strength

LEVEL: Middle/Upper LOCATION: School TIME: 1-2 class periods

OBJECTIVE: The students will learn weight training activities that will promote strength in the major muscles.

MATERIALS: Barbells, weight conditioning equipment

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how they apply to weight training for strength. (See page 21.)
2. Discuss with students the weight training exercises in Appendix B, emphasizing the correct way to perform the exercise, body areas strengthened, major muscles strengthened, and the precautions to take in performing the exercise.
3. Emphasize the rules and safety procedures to follow when working with weights (see next page).
4. Have students perform warm-up activities for five minutes.
5. Have students select partners and split into groups. Allow enough time for each person in the group to perform the exercise and then have groups move to the different workout stations.

AUTHOR'S NOTES: Weight training exercises will vary, depending upon the type of equipment available. For this lesson weights should be very light with a few repetitions so students can become familiar with the weights and the correct way to perform each exercise.
--When establishing a workout sequence, place lifts in an order that does not require use of the same muscles or muscle groups in consecutive lifts.

EXPANSION: Students can test their grip and leg strength by using a hand dynamometer or a leg dynamometer.

RESOURCES: Taylor and Mikols, "Co-Ed Weight Training."

TEACHER'S NOTES:

## RULES FOR WEIGHT TRAINING

1. Warm up before lifting weights.
2. Always lift weights with a partner to act as a safety spotter.
3. Breathe when lifting weights. Do not hold breath!
4. Never lift weights that are too heavy.
5. Always have control when lifting weights.
6. Lift weights through a full range of motion.
7. Lift, rather than swing, weights. Make each lift in a slow, smooth, continuous manner.
8. Execute the return portion of the lift slowly.
9. Lifts should always be done in the same sequence from workout to workout. In this way, the fatigue factor is always relatively the same at various points throughout the workout because lifts are done in the same order.
10. Allow enough time between workouts for adequate recovery, or muscle tissue will be torn down rather than built up. Workouts should be scheduled every other day.
11. Always be alert when lifting weights. No horseplay should be allowed.
12. Always cool down after lifting weights.

CONCEPT: Strength

LEVEL: Middle/Upper LOCATION: School TIME: 2-3 class periods

OBJECTIVE: The students will develop a personal strength training program using weights.

MATERIALS: Barbells, weight conditioning equipment

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) as they apply to isotonic weight training. Review safety and rules for weight training.
2. Have students do warm-up activities for five minutes.
3. Have students select partners and split into groups at each weight station.
4. To determine the amount of weight to be lifted, the student should determine the maximum amount of weight that can be lifted in one repetition of the exercise (1RM). Write this amount on the weight training worksheet (see Appendix C). Because isotonic exercises for strength should be done at 80 to 90 percent of 1RM, students should use the weight guidelines in Appendix D to determine their weight training resistance. Try this resistance for the exercise for five repetitions and three sets. The student should barely be able to complete the fifth repetition. If the weight is too heavy or too light, adjust it so student can barely lift weight on the fifth repetition. Once a student is able to lift seven repetitions for three sets, the student should increase the resistance.
5. Have students fill out worksheet in Appendix C.

EXPANSION: Periodically let students test themselves in class to determine their progress.
--Students can combine isotonic calisthenics and weight training into a personal strength training program (one program does not exclude the other). It is important that the exercises selected by students provide for strength training of all major areas and muscles of the body.
--Students can also design specific strength training programs for sports in which they participate in and out of school.

RESOURCES: Allen, Harrison, and Vane, Fitness for Life; Broccoletti, The Notre Dame Weight Training Program.

TEACHER'S NOTES:

CONCEPT: Strength

LEVEL: Middle/Upper LOCATION: School TIME: 1 class period

OBJECTIVE: The students will learn isometric exercises that will promote strength in the major muscles.

MATERIALS: Jump ropes, doorway

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how these apply to isometric exercises.
2. Discuss with students the isometric exercises on pages 34 and 35, emphasizing the correct way to perform the exercise, body areas strengthened, major muscles strengthened, and precautions to take when performing exercise.
3. Have students perform warm-up exercises for five minutes.
4. Have students split into groups and perform each of the exercises.

AUTHOR'S NOTES: Remind students never to hold breath during isometric exercises.
--The teacher must be sure that students perform exercises correctly.
--The teacher may want to set up stations so that groups can move from station to station to perform the exercise. Be sure station order is such that it does not require use of the same muscles at consecutive stations.

EXPANSION: Have students suggest other types of isometric exercises that will increase strength.

TEACHER'S NOTES:

CONCEPT: Muscular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand how the general principles of exercise and the guidelines for physical fitness relate to muscular endurance.

MATERIALS: None

TERMS: Muscular endurance--the ability to perform repeated muscle movements for a given period of time

ACTIVITY:
1. Discuss with students how overload, progression, and specificity relate to muscular endurance.
2. Discuss with students the guidelines for physical fitness and how they apply to muscular endurance exercises and weight training.
    a. intensity--30 to 50 percent or a 1RM (weight training) body weight or a portion of body weight (muscular endurance exercises).
    b. frequency--three to four times a week.
    c. duration--three sets of 15 to 25 repetitions.
3. Have students list different activities in work and leisure where muscular endurance is needed (e.g., carrying an armload of books to school, shoveling snow, chopping wood, etc.)

AUTHOR'S NOTES: To increase muscular endurance, the resistance is decreased and the exercise performed for a longer period of time (increased number of repetitions).

RESOURCES: Corbin and Lindsay, Fitness for Life; Falls, Wallis, and Logan, Foundations of Conditioning.

TEACHER'S NOTES:

ISOMETRIC STRENGTH TRAINING EXERCISES

| Exercise | Directions for exercise | Body areas |
|---|---|---|
| Ankle extension | Sitting on chair or bench, lift leg off floor a few inches and twist toes outward and upward as hard as possible for 5 seconds. Foot should be at a 45-degree angle to leg. | Lower legs |
| Doorway push | Stand in doorway with arms at sides of body. Bring arms upward in extended position and push on doorway as hard as possible for five seconds. | Shoulders, upper arm |
| Praying hands | Sit on floor with legs crossed and back straight. Place hands together in praying position with elbows pointing outward. Push hands against each other as hard as possible. Hold for 5 seconds. | Upper body, arms |
| Wall sit | Stand with back against wall. Slide back down wall moving feet out from wall until thighs are parallel to the floor. Using legs, push back as hard as you can against wall. Hold for 5 seconds. | Abdomen and legs |
| Curls | Stand with a rope looped under feet. Hold rope ends with palms up. Pull on rope as hard as possible. Hold for 5 seconds. | Arms |
| Toe push | Sit on floor with legs extended. Hold rope ends and loop rope around the balls of the feet. Push forward with balls of feet while pulling with arms. Hold for 5 seconds. | Arms, lower legs |
| Belly up | Lie on back on floor with arms at sides, palms against floor. While keeping head, hands, and heels in contact with floor, lift body as high off floor as possible. Hold for 5 seconds. | Shoulders, arms, buttocks |
| Belly pull | Lie on back on floor with arms at sides, palms down and legs extended. Pull in stomach muscles as tight as possible and flatten lower back against floor. Hold for 5 seconds. | Abdomen |
| Wall push | Stand with back against a wall and feet only a few inches from wall. Knees should be slightly bent with arms at sides of body. Pull in abdomen, press shoulders, small of back, and buttocks against wall. Hold for 5 seconds. | Back, abdomen, buttocks |

| Major muscles strengthened | Precautions |
|---|---|
| Soleus | Student is doing exercise correctly if soleus (muscle on front/outer portion of calf) is tight. This exercise helps prevent ankle sprains. |
| Deltoids, triceps | Keep body straight. |
| Pectorals, deltoids | Do not hold breath. |
| Quadriceps, hamstrings | Do not let knees bend beyond a 90-degree angle. |
| Biceps, brachioradialis | Keep body straight. Wear shoes. |
| Biceps, brachioradialis, soleus, gastrocnemius | Keep back straight. |
| Gluteals, triceps, deltoids | Do not lift head off floor. |
| Abdominals | None |
| Latissimus dorsi, abdominals, gluteals | None |

CONCEPT: Muscular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 1-2 class periods

OBJECTIVE: The students will perform exercises to promote endurance in the major muscles.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how they apply to exercises for muscular endurance.
2. Discuss with students the isotonic muscular endurance exercises on pages pages 38 and 39, emphasizing the correct way to perform the exercise, body areas gaining endurance, and the precautions to take in performing the exercise. Some of the exercises students learned for strength will be used for muscular endurance, only the number of repetitions will increase. A few additional exercises for muscular endurance have been included.
3. Have students perform warm-up activities for five minutes.
4. Have students split into groups at each exercise station and perform each of the exercises for muscular endurance.
5. Have students suggest other types of exercises that will increase muscular endurance.

AUTHOR'S NOTES: Stress safety in performing all exercises.
--Charts can be placed at each exercise station with information on body areas and major muscles used in each exercise.
--It is important for students to realize that many of the same exercises used to increase strength can also increase muscular endurance if the intensity is lowered and the number of repetitions is increased.

TEACHER'S NOTES:

CONCEPT: Muscular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 1-2 class periods

OBJECTIVE: The students will develop a personal isotonic exercise program to promote muscular endurance.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how they apply to muscular endurance.
2. Have students perform warm-up activities for five minutes.
3. Have students split into groups at each station and perform the muscular endurance exercises.
4. Have the students do as many of the exercises as they can up to 25 repetitions. If the students can do 25 of the exercises without tiring significantly, they might want to perform the more difficult form of the exercise. Once students can perform three sets of 25 repetitions of the less difficult form of the exercise, have them do the regular form of the exercise.
5. Have students fill out exercise worksheets (see Appendix A).

AUTHOR'S NOTES: Exercises are listed in a suggested order so that the same muscle groups will not be exercised at consecutive stations.
--The teacher should be alert to identify students with very low physical fitness.
--Instead of doing 25 repetitions for running in place, treadmill, and shuffle step, the more fit students might want to see how many repetitions of each exercise they can perform in one minute. This could be done for all three sets and students could try to increase the number of repetitions done during each set.

TEACHER'S NOTES:

ISOTONIC MUSCULAR ENDURANCE TRAINING EXERCISES

| Exercise | Direction for exercise | Body areas | Major muscles |
|---|---|---|---|
| Treadmill | To get in position, start in a push-up position and bring one knee up under chest, keeping opposite leg extended. Alternate the position of the legs as quickly as you can. | Buttocks, legs | Gluteals, hamstrings, soleus, gastrocnemius |
| Sit-ups | Lie on back with arms crossed on chest and hands on opposite shoulders and with knees bent at a 90-degree angle. Curl up by first flexing the neck and then flexing the lumbar spine until the elbows touch the thighs. Return to original position. | Abdomen, hips | Abdominals, quadriceps |
| Running in place | Run in place as fast as possible. Lift knees as high as you can. | Legs, hips, buttocks | Gluteals, hamstrings, quadriceps, soleus |
| Burpee | Stand with arms at side. Drop down to a squatting position with hands on floor (inside of elbows should be near knees). Throw legs backward until fully extended (student now in push-up position). Pull legs back into squat position. Return to starting position. | Abdomen, legs | Abdominals, quadriceps |
| Shuffle jump | Stand with knees slightly bent, the right foot in front of the left foot. Jump up and shuffle the left foot forward and the right foot backward. Do this shuffle jump as quickly as you can. | Buttocks, legs | Gluteals, quadriceps, gastrocnemius, soleus |
| Push-ups | Lie face down on floor with hands next to shoulders. Keep body straight as you push up and straighten arms. Only hands and toes should be in contact with the floor. Lower the body by bending the arms until the chest is within an inch of the floor. | Arms, chest | Triceps, pectorals, |
| High jumper | Stand in a crouched position with knees bent at almost 90 degrees. Arms should be extended backward. Jump as high as possible into the air and swing arms upward over the head. | Legs, buttocks | Gluteals, hamstrings, quadriceps, gastrocnemius, soleus |
| Back curl-up | Lie on stomach with hands clasped behind head. Have a partner hold down the calves. Curl backwards, lifting chest as far off the floor as possible. Return to starting position to complete exercise. | Lower back, buttocks, upper legs | Gluteals, hamstrings, trapezius |

| Precautions | Alternate exercise (easy) | Alternate (difficult) |
|---|---|---|
| Do not let the back sag during exercise. Keep arms straight and move legs through a full range of motion. | All students should be able to perform this exercise. | None |
| Do not arch back during exercise. Ankles should be held in place by another student or by tucking them under a stationary object. | Student can put hands under thighs to help pull up. | Weight can be added behind the head or on the chest to increase resistance, or sit-ups can be done on an inclined board. |
| Do not pound feed hard on floor while running. Run on the balls of the feet. | All students should be able to perform this exercise. | None |
| None | All students should be able to perform this exercise. | None |
| Keep stride at least 18-20 inches in length. | All students should be able to perform this exercise. | None |
| Keep head back and legs straight. | Student can do push-ups from the knees. | Student can perform push-ups with feet elevated. |
| Make sure students jump straight up into the air. | All students can perform this exercise. | Ankle weights can be added to increase the weight. |
| Do not let legs rise off the floor. | Student can put hands on thighs to lower resistance on curl-up. | Weight can be added behind the head. |

CONCEPT: Muscular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 1-2 class periods

OBJECTIVE: The students will develop a personal muscular endurance training program using weights.

MATERIALS: Barbells, weight conditioning equipment

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) as they apply to muscular endurance.
2. Have students perform warm-up activities for five minutes.
3. Have students select partners and split into groups, and have each group start at a weight station. See Appendix B for weight training activities.
4. Use trial and error to determine the amount of weight a student should lift. The student should be able to lift at least 12 repetitions but no more than 25 repetitions for three sets. See the guidelines in Appendix D to help determine the correct training resistance for muscular endurance.
5. When a student is able to lift 25 repetitions for three sets, the resistance should be increased.
6. Have students fill in weight training worksheets (see Appendix C).

AUTHOR'S NOTES: Weight train at 30 to 50 percent of maximum lift for muscular endurance.

EXPANSION: Let students test themselves periodically to determine their progress.
--Students can combine isotonic muscular endurance exercises with muscular endurance weight training exercises. It is important that the exercises students select provide muscular endurance training for all major areas and muscles of the body.
--Students can design specific training programs for the sports in which they participate at home and at school.

RESOURCE: Corbin and Lindsay, Fitness for Life.

TEACHER'S NOTES:

CONCEPT: Strength/Muscular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 1-2 class periods

OBJECTIVE: The students will develop a personal weight training program to increase both strength and muscular endurance.

MATERIALS: Barbells, weight training equipment

TERMS: None

ACTIVITY:
1. Discuss with students that one weight training program can be developed to increase both strength and muscular endurance. This is done by changing the intensity and duration as follows:
    a. intensity--50 to 70 percent maximum lift
    b. frequency--three to four per week
    c. duration--three sets of eight to 12 repetitions
2. Have students perform warm-up activities for five minutes.
3. Have students select partners and split into groups, and have each group start at a weight station.
4. Use trial and error to determine the amount of weight the student should lift. The student should be able to lift at least eight repetitions, but not more than 12 repetitions for three sets.
5. When a student is able to lift 12 repetitions for three sets, the resistance should be increased.
6. Have students fill out weight training worksheets (see Appendix C).

AUTHOR'S NOTES: Weight training programs for strength and muscular endurance were previously presented separately so students could gain an understanding of <u>each</u> of these concepts.
--Students should understand that a combined program for endurance and strength can benefit both areas in less time.
--The training weight used here should fall somewhere between the resistance used for strength training and muscular endurance training.

RESOURCES: Gettman and Pollock, "Circuit Weight Training: A Critical Review of its Physiological Benefits."

TEACHER'S NOTES:

CONCEPT: Flexibility

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand how the general principles of exercise and the guidelines for physical fitness relate to flexibility.

MATERIALS: None

TERMS: Flexibility--the ability to move a joint through a full range of motion
Stretching point--in stretching, the point at which a muscle is stretched beyond its normal length and pull can be felt

ACTIVITY:
1. Discuss with students how overload, progression, and specificity relate to flexibility.
2. Discuss with students the guidelines for physical fitness and how they apply to stretching exercises.
   a. intensity--muscle is stretched beyond its normal length to reach stretching point
   b. frequency--three to four times per week
   c. duration--hold stretch for 10 to 15 seconds for three sets
3. Have students list different activities in work and leisure where flexibility is needed (reaching up to get something from a high shelf, bending to pick something off the floor, etc.).

AUTHOR'S NOTES: Students should know that although they may be flexible in some joints, that does not mean that all joints will be flexible.
--A person's flexibility decreases with age.

RESOURCES: Corbin and Noble, "Flexibility: A Major Component of Physical Fitness."

TEACHER'S NOTES:

CONCEPT: Flexibility

LEVEL: Middle/Upper LOCATION: School TIME: 1 class period

OBJECTIVE: The students will learn stretching exercises that increase flexibility.

MATERIALS: None

TERMS: Passive stretching--stretching the joints and muscles slowly and holding the stretch for a given amount of time
Active stretching (ballistic stretching)--"bobbing" a given number of times rapidly to stretch the muscle

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how they apply to stretching exercises.
2. Discuss with students the two ways to stretch the joints and muscles: passive stretching and active stretching.
3. Have students perform a stretching exercise actively and then do the same exercise passively.
4. Discuss with the students the stretching exercises on the next two pages, emphasizing the passive method of stretching. Also discuss with students the body areas and muscles each exercise stretches.
5. Have students perform warm-up activities for five minutes.
6. Have students perform the stretching exercises using the passive method.

AUTHOR'S NOTES: Flexibility differs with individuals.
--Both types of stretching improve flexibility, but with passive stretching there is less chance to injure a muscle and there is less muscle soreness.
--The teacher might want to split students into two groups and have them stretch at stations. At each station have a chart with directions for exercise, body areas affected, and muscles stretched.
--Stretching exercises are good warm-up activities.

EXPANSION: Have students suggest other types of stretching exercises that will increase joint and muscle flexibility.

RESOURCES: Keeping the Body Flexible Through Exercise, President's Council on Physical Fitness and Sports; Volski, "Flexibility: A Component of Fitness."

TEACHER'S NOTES:

FLEXIBILITY EXERCISES

| Exercise | Directions for exercise | Body areas |
|---|---|---|
| Straddle stretch | Sit on floor with legs spread in front. Bend slowly at the hip and try to grasp right ankle. Pull with arms and try to touch head to knee. Hold for 10-15 seconds. Repeat on left side. | Lower back, back of leg, groin |
| Side stretcher | Stand with feet shoulder-width apart, with one arm up and one arm down at side. Bend to side with arm hanging down until the stretch is felt. Hold for 10-15 seconds. Repeat on opposite side. | Abdomen |
| Cat stand | Squat with feet slightly apart and palms of hands on the floor. Keep palms flat on the floor as the legs are straightened. Straighten legs until pull is felt. Hold for 10-15 seconds. | Lower back, thigh, buttocks |
| Hand clasp | Stand with feet shoulder-width apart. Have one arm reaching around behind the body and upward toward the shoulders. Try to touch fingertips or clasp hands. Reach as far as possible and hold for 10-15 seconds. Change arm position. Repeat. | Upper arm, shoulder, chest |
| Quad stretch | Stand with hand against wall for balance. Keeping left leg straight, bend right leg up so heel touches buttock. Grasp right foot and pull so that a stretch is felt in front of thigh. Hold for 10-15 seconds. Repeat with opposite leg. | Thigh |
| The Dove | Stand with feet apart, legs slightly bent, and hands clasped behind back. Slowly bend at the waist while elevating arms behind the back to the "stretching point." Hold for 10-15 seconds. | Shoulder, chest, upper arms |
| Achilles stretch | Stand approximately 2-3 feet from and facing a wall. Place palms against wall and lean forward, keeping feet flat against floor. Body must be kept straight. Pull should be felt in calves. Hold for 10-15 seconds. | Lower legs |
| Hurdlers stretch | Sit on floor with right leg extended, left leg bent to left with inside ankle touching floor. Bend slowly at hip and try to touch right ankle. Pull with arms and try to touch head to knee. Hold for 10-15 seconds. Return to starting position. Slowly lean backward, resting back and head on floor. Hold for 10-15 seconds. This is one repetition. Repeat on opposite side. | Lower back, thigh, buttocks |

| Muscles stretched | Precautions |
|---|---|
| Hamstrings, latissimus dorsi | Keep knees straight |
| Abdominals | Bend to side, not forward or backward |
| Latissimus dorsi, hamstrings, gluteals | Always keep knees slightly bent--do not hyperextend the knees. |
| Triceps, deltoids, pectorals | Partners can be used to help students gradually pull hands together. |
| Quadriceps | Do not lock knee of supporting leg. |
| Pectorals, triceps | None |
| Gastrocnemius, soleus | Make sure feet are far enough from wall to feel stretch. |
| Latissimus dorsi, hamstrings, quadriceps, gluteals | Keep right knee straight and bent left knee on floor. |

CONCEPT: Flexibility

LEVEL: Middle/Upper LOCATION: School TIME: 1 class period

OBJECTIVE: The students will incorporate flexibility exercises into their strength/muscular endurance training program.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Discuss with students the importance of combining a strength and muscular endurance program with flexibility exercises.
2. Have students incorporate flexibility exercises into their strength and muscular endurance training program.
3. Have students concentrate on those body areas that are not as flexible as others, e.g., the lower back and posterior thighs.

AUTHOR'S NOTES: If a person trains only for strength, a muscle will become stronger but lose its full range of motion.
--Flexibility exercises often help to relieve muscular soreness and improve posture.
--Flexibility in lower back and posterior thighs is important to reduce the symptoms of low back pain.
--Students can test lower back and posterior thigh flexibility with the AAHPERD Lifetime Health-Related Physical Fitness Test Manual.

RESOURCES: Allen, Harrison, and Vane, Fitness for Life; Corbin and Noble, Flexibility: A Major Component of Physical Fitness; AAHPERD Lifetime Health-Related Physical Fitness Test Manual.

TEACHER'S NOTES:

CONCEPT: Heart Rate

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will experience their heart rates increasing due to exercise.

MATERIALS: Clock or watch with second hand

TERMS: None

ACTIVITY:
1. Have students check their heart rates while sitting quietly. Students should count the pulse for 10 seconds and then multiply by six to get heart rate per minute.
2. Have students engage in vigorous exercises (e.g., run in place, jump rope) for two minutes and then take their pulses.
3. Discuss the difference in heart rate while sitting and after activity.
4. Have students discuss what other activities/exercises will make the heart rate increase.

AUTHOR'S NOTES: Pulse can be taken at the brachial artery on the wrist or at the carotid artery on the neck. The carotid artery lies between the Adam's apple and the muscle on the side of the neck.

EXPANSION: While students are engaged in different sports and activities, have them check their heart rates to determine how fast their hearts beat during different sports.

RESOURCES: Kuntzleman, Heartbeat and The Beat Goes On.

TEACHER'S NOTES:

CONCEPT: Blood Vessels

LEVEL: Middle/Upper LOCATION: School TIME: 15 minutes

OBJECTIVE: The students will understand the types of blood vessels in the body and the functions of each.

MATERIALS: Several pieces of tubing with differing diameters

TERMS: Cardiovascular system--the network of the heart and blood vessels; from the Latin roots cardiacus (heart) and vasculum (small vessel)
Artery--a vessel carrying blood away from the heart
Capillaries--a fine network of small vessels located between arteries and veins where exchanges of oxygen and waste occur between tissues and blood
Vein--a vessel carrying blood to the heart

ACTIVITY:
1. Discuss with students the term "cardiovascular system."
2. Discuss the various types of blood vessels (arteries, capillaries, veins) and their functions.
3. Different size tubing should be available to show students the different sizes of blood vessels.
4. Have students make a fist and find the veins in their arms.

AUTHOR'S NOTES: Students should understand that the pulse is the movement of blood through the arteries.
--The cardiovascular system can be compared to a city water system. Clean water is pumped into homes and is used for many purposes (e.g., washing clothes, drinking, bathing). After water is used it is drained out and returned to the city water works to be cleaned.
--The capillaries are so small that their diameters are barely larger than a red blood cell.
--Veins have valves in them that keep blood from flowing backward. As muscles in the body contract, they help to squeeze the blood back toward the heart.

RESOURCES: University of the State of New York, Cardiogenics--An Essential Part of the Physical Education Instructional Program.

TEACHER'S NOTES:

CONCEPT: Cardiovascular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand how the general principles of exercise and the guidelines for physical fitness relate to cardiovascular endurance.

MATERIALS: None

TERMS: Cardiovascular endurance (cardiorespiratory endurance)--the body's ability to continuously provide oxygen to the body as it performs work over an extended period of time

ACTIVITY:
1. Discuss with students how overload, progression, and specificity relate to cardiovascular endurance.
2. Discuss with students the guidelines for physical fitness and how they apply to cardiovascular endurance exercises:
    a. intensity--70 to 80 percent of maximum heart rate
    b. frequency--three to four times per week
    c. duration--at least 20 minutes of large muscle group activity
3. Have students list different activities in work and leisure where cardiovascular endurance is needed (e.g., running to catch a bus, playing soccer). Why is cardiovascular endurance important?

AUTHOR'S NOTES: Duration is dependent on the intensity of the activity; therefore, lower intensity activities should be conducted over longer periods of time.

RESOURCE: Falls, Wellis, and Logan, Foundations of Conditioning.

CONCEPT: Cardiovascular Endurance

LEVEL: Middle/Upper LOCATION: School TIME: 10 minutes

OBJECTIVE: The students will determine their target training heart rate.

MATERIALS: Paper and pencil

TERMS: Training heart rate--heart rate necessary to produce a training effect
Resting heart rate--number of heartbeats in one minute

ACTIVITY:
1. Discuss with students what training heart rate means.
2. Have students go through the following steps to determine their training heart rate:
   a. subtract age from 220
   b. take resting heart rate (one minute) and subtract from the figure obtained in a. (Make sure students have been sitting quietly before taking resting heart rate.)
   c. Find 75 percent of the value determined in b.
   d. Add resting heart rate to the value determined in c. (See Author's Notes.)
3. The value obtained in d (172) is the optimum heart rate at which a student should exercise for a period of at least 20 minutes in order to improve cardiovascular fitness.

AUTHOR'S NOTES: Example (15 years old)

| | | | | |
|---|---|---|---|---|
| a. | 220 - | 15 | = | 205 |
| b. | 205 - | 72 | = | 133 |
| c. | 133 x | 0.75 | = | 100 |
| d. | 72 + | 100 | = | 172 |

Students should understand that as their level of cardiovascular fitness increases, their training heart rate will also increase because of the decrease in resting heart rate. (Example: Repeat the above formula starting with a resting heart rate of 60 beats/minute.)

EXPANSION: Students should be encouraged to check their heart rates during activities in and out of class.

CONCEPT: Cardiovascular Fitness

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand the kinds of activities that promote cardiovascular fitness.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Review with students the principles of exercise and the guidelines for physical fitness (intensity, frequency, duration) and how these apply to cardiovascular activities.
2. Discuss with students some of the following activities that promote cardiovascular fitness: jogging; swimming; cycling; walking; cross-country skiing; backpacking/hiking; basketball; soccer; jumping rope. Have students engage in different activities and check their heart rates.
3. Discuss with students the fact that activities that increase the heart rate and hold it at the target heart rate level for at least 20 minutes will improve cardiovascular fitness.

AUTHOR'S NOTES: It is important that students have a complete medical examination before starting a program to improve cardiovascular fitness.

EXPANSION: Have students suggest other types of activities that will promote cardiovascular fitness.

RESOURCES: Aerobic Jogging for Students in Grades 7-12, Nebraska Department of Education; Bicycling for Pleasure and Exercise and Walking for Pleasure and Exercise; President's Council on Physical Fitness and Sports; Cooper, The New Aerobics.

TEACHER'S NOTES:

CONCEPT: Cardiovascular Fitness

LEVEL: Middle/Upper LOCATION: School TIME: 1 class period

MATERIALS: None

TERMS: None

ACTIVITY:
1. Review with students the principles of exercises and the guidelines for physical fitness (intensity, frequency, duration) and how these apply to cardiovascualr training.
2. Have students develop a personal cardiovascular program. This program should be based on the training heart rate level determined by each student.
3. Discuss with students the fact that a cardiovascular training program can involve a variety of activities. Students could plan a program that might include jogging on Tuesday, swimming on Thursday, and a basketball game on Saturday. The important point is to engage in activities that increase the heart rate to the target heart rate level and maintain this level for at least 20 minutes.

AUTHOR'S NOTES: Students should be encouraged to engage in cardiovascular training on their own time and to keep a chart of their progress.

EXPANSION: A jogging club could be started for students before or after school or as part of the school's intramural program.
--Students can periodically evaluate their progress by using the established norms for the Distance Run in the AAHPERD Lifetime Health-Related Fitness Test or Cooper's 12-minute run.

RESOURCES: Allen, Harrison, and Vane, Fitness for Life; Cooper, The New Aerobics and The Aerobics Way; Bicycling for Pleasure and Exercise, President's Council on Physical Fitness and Sports; Shimon, "Hints for Teaching Jogging."

TEACHER'S NOTES:

CONCEPT: Cardiovascular Training

LEVEL: Middle/Upper LOCATION: School TIME: 20 minutes

OBJECTIVE: The students will understand the effects of cardiovascular training on the human body.

MATERIALS: None

TERMS: Capillaries--a network of small blood vessels located between arteries and veins where exchanges between tissue and blood occur
Stroke volume--the amount of blood pumped by the heart per beat
Respiratory rate--the number of breaths per minute

ACTIVITY:
1. Discuss with students the following effects of cardiovascular training:
   a. reduced resting heart rate--by reducing the resting heart rate 10 beats per minute, a person can save approximately five million heartbeats a year.
   b. collateral circulation--number of capillaries in heart and muscles are increased, which increases the efficiency of exchange of nutrients, oxygen, and waste products. This also provides alternate pathways if blood vessels become clogged.
   c. recovery time is decreased--amount of time to recover from activity is decreased.
   d. stroke volume increases--the heart becomes larger and stronger and is able to pump more blood with each beat.
   e. increased efficiency of lungs--lungs process more air with less effort and therefore the respiratory rate decreases.
   f. increased blood volume--increases in the amount of red blood cells and hemoglobin means increases in the blood's oxygen carrying capacity.
   g. increased removal of waste products--the body is better able to remove waste products such as carbon dioxide and lactic acid from the cells. Therefore, the body can keep going longer without reaching fatigue.

EXPANSION: Students could research the effects of low cardiovascular fitness on a person's health. Also, students could report on the risk factors affecting heart health.

RESOURCES: Allen, Harrison, and Vane, Fitness for Life; Fletcher, "Cardiovascular Response to Exercise Training"; Garrison and Read, Fitness for Every Body; Matthews and Fox, The Physiological Basis of Physical Education and Athletics.

CONCEPT: Body Composition

LEVEL: Middle/Upper LOCATION: School TIME: 15 minutes

OBJECTIVE: The students will understand the concept of body composition and how it relates to physical fitness.

MATERIALS: None

TERMS: Body composition--the relative percentages of fat and fat-free body mass
Overweight--a person who weighs more than other people of similar age and size is overweight
Obese--a person who has an excessive amount of body fat is obese

ACTIVITY:
1. Discuss with students the difference between overweight and obesity.
2. Discuss the negative effects of obesity on posture, lower back, feet, and appearance. Also, explain that the heart must work harder in the obese person.
3. Explain to students that the average male has 10 to 15 percent body fat and that the average female has 15 to 20 percent body fat.

AUTHOR'S NOTES: It is possible for a muscular person to be overweight according to standard height/weight tables and still have a relatively small percentage of body fat.
--Students should understand that fat teenagers are more likely than average teenagers to become fat adults.
--The longer a person is fat, the longer and more difficult it is to lose the weight.

EXPANSION: Measurements from the AAHPERD Lifetime Health-Related Physical Fitness Test on body composition can be used for students to determine their ratings on body composition.
--Standard height/weight charts can be used by students to determine if they are over- or underweight.

RESOURCES: Kuntzleman, Fitness Discovery Activities.

TEACHER'S NOTES:

CONCEPT: Nutrition

LEVEL: Middle/Upper LOCATION: School or Home TIME: 15 minutes

OBJECTIVE: The students will become aware of their eating patterns.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Have students record the following for one week: when they eat, what they eat, how much they eat, and how long it takes to eat.
2. Have students record their daily caloric intake. Students can establish a program of weight loss or weight gain from this information.
3. Have each student evaluate personal eating patterns. If changes in eating patterns should be made, students should explain what these are and why these are needed. What insights did the student gain into personal eating patterns? Does the student eat foods that contain the proper nutrients? Does the student always, even when full, clean up the plate? How many snack-type foods does the student consume each day?

AUTHOR'S NOTES: Students should be advised to get a medical checkup before beginning a diet.
--The physical education teacher should cooperate with the health teacher to coordinate this activity with a unit on nutrition.

RESOURCES: King, "Teaching Physical Fitness: An Action Approach";
Kuntzleman, Values Strategies for Fitness.

TEACHER'S NOTES:

CONCEPT: Body Composition

LEVEL: Middle/Upper LOCATION: School TIME: 15 minutes

OBJECTIVE: The students will understand the interrelationship of diet, exercise, and weight control.

MATERIALS: None

TERMS: Calorie--unit of energy used to explain the value of food; there are 3,500 calories per pound of body fat

ACTIVITY:
1. Discuss with students that there are three ways to lose weight: dieting, exercise, and dieting plus exercise.
   dieting--to lose a pound of fat, a student must consume 3,500 calories less than normally consumed.
   exercise--to lose a pound of fat, a student must use 3,500 calories more than normally used.
   dieting plus exercise--to lose a pound of fat, a student must consume less and exercise more to achieve a combined reduction of 3,500 calories.
2. Students should understand that a combination of dieting and exercise is the best method to insure weight loss and to improve physical fitness.

AUTHOR'S NOTES: For a student to gain one pound, it is necessary to consume 3,500 calories more than normal.
--A combination of dieting and exercise helps to lose fat and also helps to prevent the loss of lean body tissue.

EXPANSION: Students who are overweight should be encouraged to establish a sound weight loss and exercise program under the direction of a physician.

TEACHER'S NOTES:

CONCEPT: Body Composition

LEVEL: Middle/Upper LOCATION: School TIME: 1 class period

OBJECTIVE: The students will understand activities that will help in controlling body fat.

MATERIALS: None

TERMS: None

ACTIVITY:
1. Discuss with students the activities on the next pages and the number of calories used for each activity.
2. Have students determine how many hours they would have to perform different activities to lose one pound of fat. For example, if a student rides a bicycle for a half-hour every other day instead of watching television, six pounds of fat will be lost in one year.
3. Have students establish an activity program to aid in controlling body fat. This can be easily coordinated with the previous exercise programs students established in past activities dealing with the other components of physical fitness.

AUTHOR'S NOTES: Students should understand that to lose a pound of fat they cannot increase their food intake. Exercise will reduce body fat as long as food intake remains the same or is decreased.
--If students desire to maintain or gain weight, they should be encouraged to exercise to improve physical fitness and also to increase their food intake. Exercise will help to increase and tone lean body weight. The teacher can combine this activity with a nutrition unit.

RESOURCES: Sienna and Ameer, "Healthy Lifestyles."

TEACHER'S NOTES:

## ACTIVITY ENERGY EXPENDITURE

To determine calories used per hour, select body weight and match it with activity (i.e., a 150 lb. person will burn 540 calories during an hour of soccer).

### Sports Activities

| Weight (lbs.) | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ARCHERY | 180 | 192 | 204 | 216 | 228 | 240 | 252 | 264 | 276 | 288 | 300 |
| BADMINTON | 255 | 272 | 289 | 306 | 323 | 340 | 357 | 374 | 391 | 408 | 425 |
| BASEBALL | 210 | 224 | 238 | 252 | 266 | 280 | 294 | 308 | 322 | 336 | 350 |
| BASKETBALL (half court) | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 |
| BICYCLING (5.5 mph) | 157 | 168 | 178 | 189 | 199 | 210 | 220 | 231 | 242 | 252 | 263 |
| BOWLING | 202 | 216 | 229 | 242 | 256 | 270 | 284 | 297 | 311 | 324 | 338 |
| DANCE (aerobic) | 255 | 272 | 289 | 306 | 323 | 340 | 357 | 374 | 391 | 408 | 425 |
| DANCE (disco) | 315 | 336 | 357 | 378 | 399 | 420 | 441 | 462 | 483 | 504 | 525 |
| FENCING | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 |
| FOOTBALL | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 |
| GOLF (walking) | 187 | 199 | 212 | 225 | 237 | 250 | 263 | 275 | 288 | 300 | 313 |
| GYMNASTICS | 232 | 247 | 263 | 279 | 294 | 310 | 326 | 341 | 357 | 372 | 388 |
| HILL CLIMBING | 367 | 391 | 416 | 441 | 465 | 490 | 515 | 539 | 564 | 588 | 613 |
| HORSEBACK RIDING | 180 | 192 | 204 | 216 | 228 | 240 | 252 | 264 | 276 | 288 | 300 |
| JOGGING (5.5 mph) | 487 | 519 | 552 | 584 | 617 | 650 | 682 | 715 | 748 | 790 | 833 |
| JUDO/KARATE | 232 | 247 | 263 | 278 | 294 | 310 | 325 | 341 | 357 | 372 | 388 |
| JUMPING ROPE | 525 | 560 | 595 | 630 | 665 | 700 | 735 | 770 | 805 | 840 | 875 |
| RACQUETBALL | 450 | 480 | 510 | 540 | 570 | 600 | 630 | 660 | 690 | 720 | 750 |
| RUNNING (10 mph) | 675 | 720 | 765 | 810 | 855 | 900 | 945 | 990 | 1035 | 1080 | 1125 |
| SCULL ROWING | 630 | 672 | 714 | 756 | 798 | 840 | 882 | 924 | 966 | 1008 | 1050 |
| SKATING (roller/ice) | 262 | 279 | 297 | 314 | 332 | 350 | 367 | 385 | 403 | 420 | 438 |


(continued on next page)

Sports Activities--continued

| Weight (lbs.) | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SKIING (cross-country) | 525 | 560 | 595 | 630 | 665 | 700 | 735 | 770 | 805 | 840 | 875 |
| SKIING (downhill) | 450 | 480 | 510 | 540 | 570 | 600 | 630 | 660 | 690 | 720 | 750 |
| SOCCER | 405 | 435 | 459 | 486 | 513 | 540 | 567 | 594 | 621 | 648 | 675 |
| SOFTBALL | 210 | 224 | 238 | 252 | 266 | 280 | 294 | 308 | 322 | 336 | 350 |
| SWIMMING (0.25 mph) | 232 | 247 | 263 | 278 | 294 | 310 | 325 | 341 | 357 | 372 | 388 |
| TENNIS | 315 | 336 | 357 | 378 | 399 | 420 | 441 | 462 | 483 | 504 | 525 |
| VOLLEYBALL | 262 | 279 | 297 | 314 | 332 | 350 | 367 | 385 | 403 | 420 | 483 |
| WALKING (2.5 mph) | 157 | 168 | 178 | 189 | 199 | 210 | 220 | 231 | 242 | 252 | 263 |
| WALKING (3.75 mph) | 225 | 240 | 255 | 270 | 285 | 300 | 315 | 330 | 345 | 360 | 375 |
| WATER SKIING | 360 | 384 | 408 | 432 | 456 | 480 | 504 | 528 | 552 | 576 | 600 |

Other Activities

| Weight (lbs.) | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DITCH DIGGING | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 |
| DRIVING A CAR | 90 | 96 | 102 | 108 | 114 | 120 | 126 | 132 | 138 | 144 | 150 |
| GARDENING | 165 | 176 | 187 | 198 | 209 | 220 | 231 | 242 | 253 | 264 | 275 |
| HOUSEWORK | 135 | 144 | 153 | 162 | 171 | 180 | 189 | 198 | 207 | 216 | 225 |
| LYING DOWN (sleep) | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 96 | 100 |
| MOWING THE LAWN | 195 | 208 | 221 | 234 | 247 | 260 | 273 | 286 | 299 | 312 | 325 |
| SITTING | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 |
| STANDING | 105 | 112 | 119 | 126 | 133 | 140 | 147 | 154 | 161 | 168 | 175 |
| WOOD CHOPPING/SAWING | 300 | 320 | 340 | 360 | 380 | 400 | 420 | 440 | 460 | 480 | 500 |

CONCEPT: Physical Fitness

LEVEL: Middle/Upper LOCATION: School TIME: 3-4 class periods

OBJECTIVE: The students will design and construct a fitness trail/course with exercise stations to develop the components of physical fitness.

MATERIALS: Building materials for the course

TERMS: None

ACTIVITY:
1. Review with students the components of physical fitness. Have them select 10 to 12 exercises that contribute to physical fitness.
2. Have students lay out a trail with exercise stations. The school's industrial arts department or system maintenance department may be able to build safe, durable equipment.
3. Simple signs can be made for each station with information on how to perform exercise, number of repetitions, etc.
4. Fitness trail should be used to help students improve their physical fitness.

AUTHOR'S NOTES: Students can contact commercial fitness/par course companies for information and ideas for exercise stations.
--Area where course is laid out must be checked for safety.

EXPANSION: Fitness trail should be made available to the entire school and local community.
--Have students discuss ways to "educate" community residents about the purpose and proper use of the fitness trail. Students could plan a "fitness fair" for the community.

RESOURCES: "Exer-Path," Montgomery County, Maryland, Public Schools; Sobey, "Outdoor Circuit Training Courses--To Build or Buy a Fitness Trail."

TEACHER'S NOTES:

APPENDIX A

EXERCISE WORKSHEET

Most exercises (e.g., push ups or sit ups) have three levels of difficulty. Using copies of this worksheet, students record their performance on the line that matches the level of difficulty of the exercise. Students will be able to see their improvement.

| EXERCISE | LEVEL | BODY PARTS | DATE REPS | DATE SETS | DATE REPS | DATE SETS | DATE REPS | DATE SETS | DATE REPS | DATE SETS | DATE REPS | DATE SETS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Difficult | | | | | | | | | | | |
| | Regular | | | | | | | | | | | |
| | Easy | | | | | | | | | | | |
| | Difficult | | | | | | | | | | | |
| | Regular | | | | | | | | | | | |
| | Easy | | | | | | | | | | | |
| | Difficult | | | | | | | | | | | |
| | Regular | | | | | | | | | | | |
| | Easy | | | | | | | | | | | |
| | Difficult | | | | | | | | | | | |
| | Regular | | | | | | | | | | | |
| | Easy | | | | | | | | | | | |
| | Difficult | | | | | | | | | | | |
| | Regular | | | | | | | | | | | |
| | Easy | | | | | | | | | | | |
| | Difficult | | | | | | | | | | | |
| | Regular | | | | | | | | | | | |
| | Easy | | | | | | | | | | | |

APPENDIX B WEIGHT TRAINING ACTIVITIES

| Exercise | Directions for exercise |
|---|---|
| Bench press | Lie back on bench with feet flat on floor on either side of bench. Bar should be held with palms down grip, shoulder width apart. Rest barbell on chest. Raise bar upward until arms lock. Return to starting position to complete exercise. |
| Half squats | Place barbells on shoulders. Keep back flat and lower body until thighs are parallel with floor (not quite 90 degrees). Raise to starting position to complete exercise. |
| Standing arm curl | Standing, grasp barbell palms up with hands shoulder-width apart. Rest barbells on thighs. Curl barbell up to shoulders and return to starting position to complete exercise. |
| Toe raise | Place barbell on shoulders, with feet 8-10 inches apart. Rise up on toes as far as possible and return to starting position to complete exercise. |
| Seated overhead press | Sit on bench with barbell held palms down at midline of chest. Push bar upwards until arms lock. Lower barbell to chest position to complete exercise. |
| Lat pulldown (machine) | Kneeling, grasp bar palms down at widest points with arms fully extended. Pull bar down behind neck and return to starting position to complete exercise. (For variety, this exercise may also be done by pulling the bar down in front.) |
| Leg extension (machine) | Sit with fronts of ankles against the bar. Extend knee until leg is parallel to floor. Return to starting position to complete exercise. |
| Bent arm pullover | Lie on back on bench with feet flat on floor on either side of bench. Hang head over edge of bench. Using palms-down grip with hands 12 inches apart, rest bar on chest. Lower bar back over head as far as possible with elbows bent. Pull the bar back to the starting position to complete the exercise. |
| Leg curl | Lie face down with knees just over edge of bench and backs of heels against bar. Curl feet upward until they are over or touching buttocks. Return to starting position to complete the exercise. |
| Upright rowing | Standing, grasp bar palms down with hands 4-6 inches apart. Rest barbell on thighs. Raise barbell to touch chin. Elbows should be pointed outward. Lower barbell to starting position to complete exercise. |

| Body areas | Major muscles strengthened | Precautions |
|---|---|---|
| Chest, shoulders, upper arms | Deltoids, triceps, pectorals | Have at least one spotter (preferably two) to assist with bar. Do not arch back. |
| Legs, lower back | Quadriceps, gluteals, hamstrings, gastrocnemius, soleus | Have at least one spotter (preferably two) to assist with bar. Keep back straight (do not round shoulders). Do not bounce. As a safety device, a bench can be placed behind the person lifting in case balance is lost. |
| Arms | Biceps, brachioradialis | Keep body erect. Do not bend back. Keep elbows close to body. |
| Lower legs | Gastrocnemius, soleus | Keep body straight and do not bend knees. |
| Shoulders, back, chest, upper arms | Triceps, deltoids, pectorals, trapezius | Keep head and back straight. |
| Forearms, back, upper chest | Latissimus dorsi, trapezius, pectorals, brachioradialis | Keep body straight and do not let body rise off ground to assist in pulling weight. |
| Thigh, knee joint | Quadriceps | Keep back straight. Do not bounce weight. Make sure leg is fully extended during exercise. |
| Chest, shoulders | Deltoids, pectorals, latissimus dorsi | Keep hips on bench and avoid unnecessary arching of back. Keep elbows close to head and pointing toward ceiling during the exercise. Keep bar close to face during exercise. |
| Upper legs, buttocks | Hamstrings, gluteals | Keep body from moving on bench Do not swing or bounce weight. |
| Shoulders, front of upper arms back | Biceps, deltoids, trapezius | Keep body erect and barbell close to body with elbows above hands. |

APPENDIX C

WEIGHT TRAINING WORKSHEET

| EXERCISE | BODY PARTS | MAX. 1 LIFT | DATE | | | DATE | | | DATE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WT. | REPS | SETS | WT. | REPS | SETS | WT. | REPS | SETS |
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APPENDIX D

## WEIGHT GUIDELINES FOR STRENGTH AND MUSCULAR ENDURANCE TRAINING

To determine the amount of weight to lift, a student needs to determine his or her 1RM (1RM is defined as the maximum amount of weight in one lift). Then the student should locate his or her 1RM on the chart. To the right of the 1RM, the muscular endurance training weight is indicated, and to the left, the strength training weight is indicated. For example: if a student's 1RM is 150 lbs., strength training weight is 128 lbs. and muscular endurance training weight is 60 lbs.

It is important to remember that these are guidelines and if a student can lift more or less than the recommended number of repetitions, he or she needs to either increase or decrease the weight being lifted.

| STRENGTH | 1RM | MUSCULAR ENDURANCE |
|---|---|---|
| 2 | 3 | 1 |
| 5 | 6 | 2 |
| 6 | 9 | 4 |
| 10 | 12 | 5 |
| 13 | 15 | 6 |
| 15 | 18 | 7 |
| 18 | 21 | 8 |
| 20 | 24 | 10 |
| 23 | 27 | 11 |
| 26 | 30 | 12 |
| 28 | 33 | 13 |
| 31 | 36 | 14 |
| 33 | 39 | 16 |
| 36 | 42 | 17 |
| 38 | 45 | 18 |
| 41 | 48 | 19 |
| 43 | 51 | 20 |
| 46 | 54 | 22 |
| 48 | 57 | 23 |
| 51 | 60 | 24 |
| 54 | 63 | 25 |
| 56 | 66 | 26 |
| 59 | 69 | 28 |

| STRENGTH | 1RM | MUSCULAR ENDURANCE |
|---|---|---|
| 61 | 72 | 29 |
| 64 | 75 | 30 |
| 66 | 78 | 31 |
| 69 | 81 | 32 |
| 71 | 84 | 34 |
| 74 | 87 | 35 |
| 77 | 90 | 36 |
| 79 | 93 | 37 |
| 82 | 96 | 38 |
| 84 | 99 | 40 |
| 87 | 102 | 41 |
| 89 | 105 | 42 |
| 92 | 108 | 43 |
| 94 | 111 | 44 |
| 97 | 114 | 46 |
| 99 | 117 | 47 |
| 102 | 120 | 48 |
| 105 | 123 | 49 |
| 107 | 126 | 50 |
| 110 | 129 | 52 |
| 112 | 132 | 53 |
| 115 | 135 | 54 |
| 117 | 138 | 55 |

| STRENGTH | 1RM | MUSCULAR ENDURANCE |
|---|---|---|
| 120 | 141 | 56 |
| 122 | 144 | 58 |
| 125 | 147 | 59 |
| 128 | 150 | 60 |
| 130 | 153 | 61 |
| 133 | 156 | 62 |
| 135 | 159 | 64 |
| 138 | 162 | 65 |
| 140 | 165 | 66 |
| 143 | 168 | 67 |
| 145 | 171 | 68 |
| 148 | 174 | 70 |
| 150 | 177 | 71 |
| 153 | 180 | 72 |
| 156 | 183 | 73 |
| 158 | 186 | 74 |
| 161 | 189 | 76 |
| 163 | 192 | 77 |
| 166 | 195 | 78 |
| 168 | 198 | 79 |
| 171 | 201 | 80 |
| 173 | 204 | 82 |
| 176 | 207 | 83 |

| STRENGTH | 1RM | MUSCULAR ENDURANCE |
|---|---|---|
| 179 | 210 | 84 |
| 181 | 213 | 85 |
| 184 | 216 | 86 |
| 186 | 219 | 88 |
| 189 | 222 | 89 |
| 191 | 225 | 90 |
| 194 | 228 | 91 |
| 197 | 231 | 93 |
| 200 | 234 | 94 |
| 202 | 238 | 95 |
| 205 | 241 | 96 |
| 207 | 244 | 98 |
| 210 | 247 | 99 |
| 213 | 250 | 100 |
| 215 | 253 | 101 |
| 218 | 256 | 102 |
| 220 | 259 | 104 |
| 223 | 262 | 105 |
| 225 | 265 | 106 |
| 228 | 268 | 107 |
| 230 | 271 | 108 |
| 233 | 274 | 110 |
| 235 | 277 | 111 |

| STRENGTH | 1RM | MUSCULAR ENDURANCE |
|---|---|---|
| 238 | 280 | 112 |
| 241 | 283 | 113 |
| 243 | 286 | 114 |
| 246 | 289 | 116 |
| 248 | 292 | 117 |
| 251 | 295 | 118 |
| 253 | 298 | 119 |
| 256 | 301 | 120 |
| 258 | 304 | 121 |
| 261 | 307 | 123 |
| 264 | 310 | 124 |
| 266 | 313 | 125 |
| 269 | 316 | 126 |
| 271 | 319 | 128 |
| 274 | 322 | 129 |
| 276 | 325 | 130 |
| 279 | 328 | 131 |
| 281 | 331 | 132 |
| 284 | 334 | 134 |
| 286 | 337 | 135 |
| 289 | 340 | 136 |
| 292 | 343 | 137 |
| 294 | 346 | 138 |

| STRENGTH | 1RM | MUSCULAR ENDURANCE |
|---|---|---|
| 297 | 349 | 140 |
| 299 | 352 | 141 |
| 302 | 355 | 142 |
| 304 | 358 | 143 |
| 307 | 361 | 144 |
| 309 | 364 | 146 |
| 312 | 367 | 147 |
| 315 | 370 | 148 |
| 317 | 373 | 149 |
| 320 | 376 | 150 |
| 322 | 379 | 152 |
| 325 | 382 | 153 |
| 327 | 385 | 154 |
| 330 | 388 | 155 |
| 332 | 391 | 156 |
| 335 | 394 | 158 |
| 337 | 397 | 159 |
| 340 | 400 | 160 |
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This packet contains 55 discovery activities for fitness, nutrition, stress, smoking, and body composition. All are easily reproducible.

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A workout guide for children in grades 4 through 6, activities focus on improving cardiovascular fitness and developing basic physical skills, and workouts build in intensity, duration, and difficulty of exercise.

_____. Fitness for Junior High Students. Spring Arbor, Mich.: Arbor Press, 1979.
A series of workouts for building cardiovascular fitness for students in grades 7 through 9, the activities review basic physical education skills and exercises.

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This manual explains the why and how of aerobic group exercise, including warm-up, heart conditioning, and tapering-off activities.

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Training rules, diet, and injuries are discussed in relation to setting up a running program.

Muscular Strength--A Basic Component of Physical Fitness. President's Council on Physical Fitness and Sports, Washington, D.C.
Strength training, including exercise and weight training activities, is discussed in this basic pamphlet.

National Conference of Senior Officials to Consider UNESCO Recommendations on Physical Education and Sport. Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1978.
Recommendations for physical education and sport were proposed from this November 16-18, 1977, conference in Washington, D.C.

Nave, Larry. "Aerobics--An Individualized Fitness Program." Journal of Physical Education and Recreation 49 (4):19-20; April 1978. (ERIC No. EJ 187 718.)
Set-up of an aerobics program in a junior college is described.

Nelson, Dale O. "Dynamic Fitness." The Physical Educator 32 (2):59-60; May 1975.
The fitness program at Utah State University is presented.

Nordham, Catherine. Fitness and Americans. Mimeographed. Indianapolis, Ind., 1976. (ERIC Document Reproduction Service No. ED 134 582.)
Following a number of observations about physical fitness in America, this document suggests ways to improve physical education programs and improve the general level of physical fitness in America.

Pangrazi, Bob. "Treating the Obese Child in the Public School Setting." AAHPER Research Consortium Papers: Sport, Health, Fitness, and Dance 1 (2)59-62; 1978.
The author suggests ways to work with obese children within the physical education setting.

Pate, Russell R. "Fitness Testing with a Realistic Purpose." Journal of Physical Education and Recreation 49 (1):47-8; January 1978. (ERIC No. EJ 176 558.)
This article will stimulate readers to reassess their current beliefs regarding the proper role of fitness testing in secondary schools. Ideas are suggested for making the testing process more interesting and useful for both teachers and students.

_____. "Physical Education and Exercise Physiology: A Cooperative Venture for the '80s." The Exercise Physiology Academy Newsletter 1 (1):5-6; Spring 1979.
Cooperation is needed between the exercise physiologist and the practicing teacher in providing fitness education to students.

_____. Teaching Physical Fitness Concepts. Columbia, S.C.: University of South Carolina NASPE Media Center, 1978.
These videotaped fitness programs at the elementary, secondary, and college levels illustrate the teaching of fitness concepts.

_____, and Corbin, Charles. "Implications for Curriculums." Journal of Physical Education and Recreation 52 (1):36-8; January 1981.
The author examines the implications of the AAHPERD Lifetime Health-Related Physical Fitness Test for the physical education curriculum and makes suggestions on how the test might be used in a physical education program.

"Physical Education--The Essential School Subject for the Nation's Work Force." American Association of Fitness Directors in Business and Industry Action 2 (2):2; August 1979.
Statement of the AAFDBI clarified their position relative to the teaching of physical education in the U.S. school system today.

"Physical Fitness: A Downhill Race?" Education USA 22 (23):198; February 18 1980.
This brief article summarizes a study by Guy Rieff on the status of youth physical fitness and proposed guidelines for physical education of children.

Plowman, Sharon, and Falls, Harold. "AAHPER Youth Fitness Test Revision." Journal of Physical Education and Recreation 49 (9):22-4; November-December 1980.
In describing the rationale for revising the AAHPER Youth Fitness Test, this article distinguishes physical fitness related to functional health from physical performance related primarily to athletic ability.

Pollock, Michael L., and Blair, Steven N. "Exercise Prescription." Journal of Physical Education and Recreation 52 (1):27-9; January 1981.
This article looks at the practical guidelines concerning the right amounts of exercise to develop and maintain health-related fitness as described in the new AAHPERD Lifetime Health-Related Physical Fitness Test Manual.

Powell, Frank M., and Molnar, Sandor. Concepts in Physical Fitness: A Laboratory Manual. Minneapolis: Ranges Publishing Co., 1978.
High school and college students can use this laboratory manual to ascertain their physical needs and how best to develop and maintain a high level of physical fitness and health through activity.

Proceedings of the First National Conference on Physical Fitness and Sports for All, February 1-2, 1980. Washington, D.C.: President's Council on Physical Fitness and Sports, May 1980.
Proceedings, papers, and reports presented at the First National Conference on Physical Fitness and Sports for All are published, including a speech by President Carter promoting fitness and physical activity.

Project Superheart--Annual Report, 1978-1979. Institute for the Experimentation in Teacher Education. Cortland, N.Y.: State University College at Cortland, 1979.
As demonstrated by a cardiovascular health knowledge test and a yards-per-minute run, this report suggests that an intensive program of cardiovascular health education and physical activities can improve test results of children ages 6 to 12.

Rea, Kent. "A Total YMCA Running Program." The Journal of Physical Education 77 (5):104; May/June 1980.
Brief article highlights the establishment and major activities of a YMCA running club in Nashville, Tennessee.

Roush, Robert. "Cardiovascular Disease and Diet." Health Education 11 (5):23-7; October 1980.
The need for the health educator to take the initiative in teaching students sound medical information about heart disease is discussed. Article reports studies describing the magnitude of the problem of cardiovascular disease and atherosclerosis, the relationship of diet and cardiovascular disease, and selected health education programs that have lipid-lowering effects.

Ryan, Allan J. "Daily Physical Education." Physician and Sportsmedicine 8 (9):43; September 1980.
In this editorial promoting the benefits of physical education and the need for a daily physical education program, current selected state requirements for physical education are given.

Sartorious, Spencer. "An Individualized Fitness Program for High School Students." Journal of Physical Education and Recreation 51 (6):56; June 1980.
The aerobics unit developed at Sidney High School in Montana is described.

Secondary Physical Education Instructional Guide. Rockville, Md.: Montgomery County Public Schools, 1978. (ERIC Document Reproduction Service No. ED 160 600.)
Instructional guide gives secondary physical education teachers a basis and direction for realizing the objectives related to the development of motor skills and physical fitness.

Sharkey, Brian; Wilson, Dave; Whiddon, Tom; and Miller, Kathy. "Fit to Work." Journal of Physical Education and Recreation 49 (7):18-24; September 1970.
This article suggests ways to measure important job-related components of muscular fitness, with emphasis on firefighters.

Sheffield, Emilyn A. Total Fitness for Women. Santa Monica, Calif.: Goodyear Publishing Co., 1980.
A book for women, this one contains information on muscular and cardiorespiratory fitness, flexibility, nutrition, and assessment techniques.

Shephard, Roy J., and LaVallee, Hughes, eds. Physical Fitness Assessment. Springfield, Ill.: Charles C. Thomas, 1978.
This collection of articles covers a wide range of subjects related to physical fitness assessment. Specific topics include a comparison of various international proposals for standardizing fitness testing, and a detailed consideration of genetic, psychological, and environmental factors involved in human performance.

Shimon, Paul. "Hints for Teaching Jogging." The Physical Educator 32 (3):159-60; October 1975. (ERIC No. EJ 138 755.)
In addition to ideas for jogging instruction, this short article stresses the individualized approach to activity.

Sienna, Phillip, and Ameer, Jeffrey B. "Healthy Lifestyles." Journal of Physical Education and Recreation 50 (8):21; October 1979. (ERIC No. EJ 216 915.)
Cognitive development concepts in health are discussed so that students become aware of the options available in deciding individual life styles.

Simmons, Thurman. "Run for Fitness." Journal of Physical Education and Recreation 78 (3):61; March 1979. (ERIC No. EJ 205 630.)
An experimental aerobics program conducted at Holbrook High School in Arizona had as its goal to inspire students to engage in lifelong fitness activities.

Sobey, Edwin J.C. "Outdoor Circuit Training Courses--To Build or Buy a Fitness Trail." The Journal of Physical Education 78 (1):4-5; September-October 1980.
Options and ideas are offered for building an individual fitness trail. A user runs from one exercise station to the next, performing a specific number of exercise repetitions at each station.

Spivak, Howard R. "Health Problems in the Elementary School." The National Elementary School Principal 57 (2):19-22; January 1978.
Children's diets and the effects their diets have on cholesterol intake and general health should be examined.

Stone, William J. "Running Tests for 7-9 Year Old Children." AAHPER Research Consortium Symposium Papers: Sport, Health, Fitness and Dance. 1 (2):54-7; 1978.
The author suggests a need to develop cardiovascular fitness tests and national norms for primary schoolchildren.

Strauss, R.H., ed. Sports Medicine and Physiology. Philadelphia: W.B. Saunders Co., 1979.
Written for physical educators, coaches, athletic trainers, and others in health-related fields, this text includes sections on basic physiology of exercise, advanced topics in exercise, sports injuries, and special topics in sports medicine.

Stroble, Joe, and Bird, Maureen. "The Health Hustle: Fitness to Music." Journal of Physical Education and Recreation 49 (6):67-8; June 1978. (ERIC No. EJ 187 909.)
In this program developed in Scarborough, Ontario, elementary students exercise daily to music to improve cardiovascular fitness.

"Structure and Function of Skeletal Muscle." Physician and Sportsmedicine 5 (5):34-46; May 1979.
Muscle structure and function along with types of muscle contractions are discussed.

Suggestions for School Programs--Youth Physical Fitness. Washington, D.C.: President's Council on Physical Fitness and Sports, 1979.
Many class activities and exercises are noted in this publication that assists in promoting effective physical education programs to develop fitness.

Svoboda, Milan. Exercise Physiology--Basic Stuff, Series I. Reston, Va.: AAHPERD Publications, 1981.
This text presents the knowledge base in exercise physiology in a manner that is relevant to practical instruction and is easily understood by teachers and students.

Taylor, Bernie, and Mikols, Walter J. "Co-Ed Weight Training." Journal of Physical Education and Recreation 48 (6):22-3; June 1977. (ERIC No. EJ 168 803.)
Co-educational weight training is discussed with suggested workouts.

Team Sports--Jump Roping. Lincoln, Neb.: Nebraska Department of Education, 1978. (ERIC Document Reproduction Service No. ED 190 492.)
Jump rope activities to promote physical fitness are presented.

Teneschok, Michael. "Jogging Geography." Journal of Physical Education and Recreation 49 (6):68; June 1978. (ERIC No. EJ 187 910.)
Social studies, geography, and history are incorporated into physical education as students "jog around the world." Students keep an individual log of miles run and learn interesting facts as they trace their path along a map of the world.

The Way I Am--Idaho Health Education Guide, Grades 7-12. Idaho State Department of Education, Division of Instructional Improvement, Spring 1979.
Idaho's curriculum guide contains section on teaching physical fitness knowledge.

Thwaites, Anne. "A Morning Fun Program: Creating Positive Attitudes Toward Physical Activity." The Australian Journal for Health, Physical Education and Recreation (86):31-2; September 1980.
In addition to the school's physical education classes, students spend five to ten minutes doing activities and exercises in class for fun.

University of the State of New York. Cardiogenics--An Essential Part of the Physical Education Instructional Program. New York: State Education Department, Bureau of General Education Curriculum Development, 1979. (ERIC Document Reproduction Service No. ED 186 383.)
This guide to curriculum ideas for secondary school physical fitness and heart disease intervention programs promotes the concept of "wellness" through a cross-disciplinary approach to "preventive medicine."

Vodak, Paul. Exercise: The Why and How. Palo Alto, Calif.: Bull Publishing Co., 1980.
The benefits, limits, and risks of exercise are stated, followed by instructions for establishing an individualized fitness training program.

Volski, Robert V. "Flexibility: A Component of Fitness." The First Aider 50 (5):17; January 1981.
Stretching exercises to promote flexibility in different muscle groups are presented.

Walking for Pleasure and Exercise. Washington, D.C.: President's Council on Physical Fitness and Sports.
This pamphlet notes the benefits of walking to promote fitness and instructs on proper walking techniques.

Yankelovich, Shelly, and White, Ini. The General Mills American Family Report, 1978-1979--Family Health in an Era of Stress. Minneapolis: General Mills, 1979.
A survey of the status of family health is reported and analyzed.